

THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

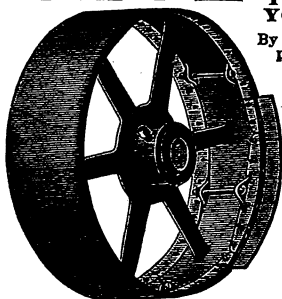
Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

Vol. LII: No. 13. New York, Thursday, September 28, 1893.

\$4.50 a Year, including Postage.
Single Copies, Ten Cents.

Reading Matter Contents.....page 585
Classified List of Advertisers.... " 95
Alphabetical Index to Advertisers " 99
Advertising and Subscription Rates " 595


SAVE YOUR POWER, YOUR BELTS, YOUR MONEY



By covering your pulleys with
SHULTZ Patent Leather Pulley Covering
Send for Circular I to
SHULTZ BELTING CO.,

ST. LOUIS, MO.
NEW YORK, N. Y., 225 Pearl St., A. B. Laurence, Mgr.
BOSTON, MASS., 164 Summer St., G. J. Kelley, Mgr.
PHILADELPHIA, PA., 129 N. 8d St., J. Garnett, Mgr.

TUDOR IRON WORKS
ST. LOUIS,
Manufacturers of
**MINING RAILS, SPIKES,
TRACK FASTENINGS.**



Every Steam Plant
Should be provided with
**BRISTOL'S RECORDING
PRESSURE GAUGE.**
Low in Price and Guaranteed.
Send for circulars and fac-simile
chart.
THE BRISTOLS' MFG. CO.
Waterbury, Conn.



**SOLID BRAIDED
CORDAGE.**
All Kinds. Sizes and Colors.
SEND FOR SAMPLES.
Samson Cordage Works,
BOSTON, MASS.

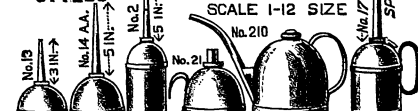


TURNBUCKLES.

BRANCH OFFICE: **Cleveland**
136 Liberty St., **City Forge and Iron Co.,**
NEW YORK. CLEVELAND, O.

Send for Catalogue and Trade Discounts.

**"COPPERIZED C. R. SWEDOH
STEEL OILERS & C."**
ALL SIZES & STYLES
TRADE MARKS
REGISTERED
BURNISHED FINISH
CHEAP & ELEGANT
SCALE 1-12 SIZE




LARGE STOCK, BEST OF GOODS & FACILITIES
THE WILMOT & HOBBS MFG. CO
HOT & COLD ROLLING MILLS AND FACTORIES
BRIDGEPORT, CONN. U. S. A.
STORE, 20 MURRAY ST., NEW YORK.

Dealers will find it to their advantage to place a large stock order early, as they will be executed in the order in which they are received. This is the best selling line of Oilers ever produced. See full illustrations, page 59.

SMOKELESS PAPER SHELLS

Loaded with Nitro Powders, Schultze, E. C.,
S. S. and American Wood.

—SOLD ONLY THROUGH DEALERS.—

SALMON  **COLOR.**

Made in 10, 12 and 16 gauge. Price-list on application.
Packed 25 in a box, 500 in a case.

MANUFACTURED BY

The Union Metallic Cartridge Co.,
BRIDGEPORT, CONN.

RANDOLPH & CLOWES,

WATERBURY, - CONN.

Western Depot, 71 West Washington St., Chicago, Ill.

Branch Offices: 104 John St., New York.
333 Walnut St., Philadelphia, Pa.
21 Milk St., Boston, Mass.
Room 208 Neave Building, Cincinnati, O.

SEAMLESS DRAWN BRASS AND COPPER TUBING.

Hot and Cold Rolled Sheet Copper and Brass of all kinds.



TO THOSE INTERESTED IN OR USING VALVES.
We have recently made improvements in the manufacture of **JENKINS BROS.' VALVES** having increased the number of bolts, thickness of flanges, &c.
We shall manufacture one grade of valve only, suitable for high or low pressure steam. The Jenkins Discs used in these valves are suitable for high or low pressure. We guarantee all valves stamped with Trade-Mark.
JENKINS BROS.,
NEW YORK. PHILADELPHIA. BOSTON and CHICAGO.

THE WILMOT & HOBBS MFG. COMPANY,

MAIN OFFICE, MILLS AND FACTORIES AT
BRIDGEPORT, CONN.

STORE, 20 MURRAY ST., NEW YORK.
(CONNECTED BY TELEPHONE.)

BESSEMER, OPEN HEARTH,
And the Celebrated and Unequaled

"SWEDOH"
(REGISTERED TRADE-MARK.)

Annual Capacity 15,000 Tons
Cold Rolled Steel.

Annual Capacity 30,000 Tons
Hot Rolled Steel.

HOT and COLD ROLLED SHEET, BAND and STRIP STEEL.

Used for all Pressed, Stamped and Drawn Work. Easily Brass, Copper, Bronze or Nickel Plated, Tinned or Japanned. Furnished with plain Blue, Pickled, Annealed or Bright Surface, and with Round Edges or Sheared to Exact width, Coiled or Cut to Lengths, and in any Degree of Stiffness or Ductility required. SEND FOR NEW STEEL DEPARTMENT PAMPHLET. For samples of the difficult stamped and drawn work which can be made from "Swedoh" Steel, call at any Hardware Store and ask to be shown our "Anti-Rust Copperized C. R. SWEDOH Steel OILERS."

Rainey Connellsville Furnace and Foundry Coke.

The only Coke you can buy and know you are getting the best that can be manufactured. All our works in the heart of the Region, within four miles of Connellsville, Pa.

CAPACITY, 3,000 TONS DAILY.

W. J. RAINEY,

MAIN OFFICE:
Mercantile Bank Building.

CLEVELAND, OHIO.

THE
ANSONIA BRASS
AND **COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

Ingot Copper.

SOLE MANUFACTURERS

Tobin Bronze

(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,
Square and Hexagon Bars, for Pump
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York.

THE
New Haven Copper Co.,

SOLE MAKERS OF

POLISHED COPPER

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND
DEALERS IN

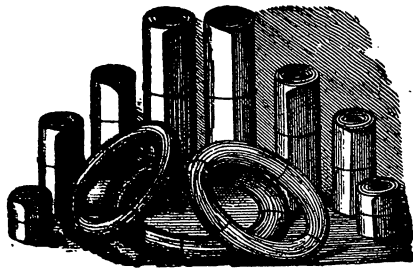
BRAZERS' & SHEATHING COPPER,

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



Waterbury Brass Co.

Established 1845.

Sheet, Roll and Platers' Brass,

German Silver, Copper, Brass and Ger-
man Silver Wire, Brass and
Copper Tubing,

COPPER RIVETS AND BURRS
PERCUSSION CAPS,
TAPE MEASURES,
METALLIC EYELETS,

Brass Kettles, Brass Tags, Powder Flasks,
Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION.
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Provi-
dence, R. I.

MILLS AT WATERBURY, CONN.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

INGOT COPPER, SPELTER, LEAD, TIN,
ANTIMONY, SOLDER & OLD METALS,
100 John Street, - New York.

Iron and Steel. The Journal of the Iron and Steel
Institute. No. 2, 1892. 584 pages, with 27 plates.
\$6.00

For Sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.

THE CELEBRATED ACID RESISTING DEOXIDIZED BRONZE

IN INGOTS OR CASTINGS, AND

DEOXIDIZED BABBITT METALS.

BEST IN THE WORLD.

Large Castings a Specialty.

Bridgeport Deoxidized Bronze and Metal Co.,
BRIDGEPORT, CONN.

MATTHIESSEN & HEGELER ZINC CO.,

LA SALLE, ILLINOIS,

SMELTERS OF SPELTER.

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc out to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

BRASS GOODS MFG. CO.,

Mfrs. of Stamped Brass, Silver and Nicked Goods, Brass Labels for Cans and Rubber Moulds,

BRONZE DOOR KNOBS

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin
Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.

HENDRICKS BROTHERS,

Proprietors of the

Belleville Copper Rolling Mills,

Manufacturers of

**Braziers', Bolt and Sheathing
COPPER.**

COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

THE PLUME & ATWOOD MFG. CO.

MANUFACTURERS OF

Sheet and Roll Brass

—AND—

WIRE,

GERMAN SILVER AND GILDING METAL,
COPPER RIVETS AND BURRS, COP-
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,
Kerosene Burners, Lamp
Trimmings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,

THOMASTON, CONN.

FACTORIES:

WATERBURY, CONN.

Holmes, Booth & Haydens

MANUFACTURERS OF

Sheet, Roll Brass, Brass and
German Silver Wire.

COPPER RIVETS AND BURRS

JACK CHAIN.

SEAMLESS TUBING, BRASS AND COPPER.

Brazed Brass and Copper Tubing,
Bare and Insulated Wire for Elec-
tric Lighting and Street Rail-
way Use, Lamp Goods and
Kerosene Burners in
great variety.

FACTORIES:

Waterbury, Conn.

25 Park Place,

New York.

SCOVILL MFG. COMPANY,

Manufacturers of

BRASS

Sheet, Wire, Tubes.

BUTT HINGES,
BUTTONS,
LAMP GOODS,
NOVELTIES.

PURE ALUMINUM

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

453 Broome Street, New York.

210 Lake Street, Chicago.

20 High Street, Boston.

WILLIAM S. FEARING.

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

Sheet Brass, Fancy Sheet Brass,
German Silver, Copper, Brass
and German Silver Wire,
Brazed and Seamless Brass and
Copper Tubes, Brass and Cop-
per Rods, Brass Ferrules,
Pure Copper Wire,
Sheet and Ingot Copper, Spelter,
Tin, Antimony, Lead, &c.

Rough Casting of Aluminum.

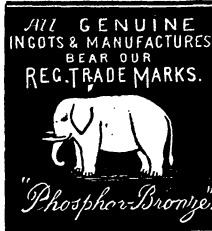
Aluminum Bronze, German Silver Bronze and al
kinds of Metals. Manufacturers of Chandeliers, Meta
Picture Frames, Ink Stands, Figures, Statues, etc.
Stair Carpet Holders a Specialty.

St. Louis Bronze & Aluminum Works,

3741-3743 North Broadway,

ST. LOUIS, MO.

**ELEPHANT
TRADE-MARK.**



PHOSPHOR-BRONZE
INGOTS, CASTINGS, WIRE, SHEET &C.
THE PHOSPHOR BRONZE SMELTING CO. LIMITED
512 ARCH ST. PHILADELPHIA PA. U.S.A.
ORIGINAL MANUFACTURERS OF PHOSPHOR-BRONZE IN THE UNITED STATES AND SOLE MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

**PHOSPHOR
BRONZE.**

The Wm. Cramp & Sons S. & E. B. Co., PHILADELPHIA, PENNA.

BRASS FOUNDERS.

YORK AND THOMPSON STS.,
SOLE MANUFACTURERS OF

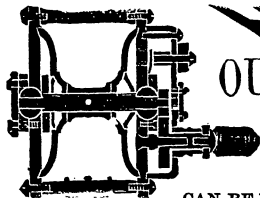
AMERICAN MANGANESE BRONZE.



MANGANESE BRONZE PROPELLER WHEELS A SPECIALTY.

Our Manganese Bronze is invaluable where Castings of great Tensile Strength are needed. In this quality it is nearer Steel than any other alloy in the market, and in appearance the castings are unequaled.

We Make Larger Castings and More of Them than Any Competitor.



HENDRYX
EVERY REEL WARRANTED.
says of Hendryx patented Adjustable Globe Bearing Aluminum Reels, "perfectly constructed and beautifully finished in every part, these Reels work as truly as watches." Actual weights, Single Action, 2½ ounces; Multiplying, 4½ ounces; Quadruple, 4½ ounces.

THE ANDREW B. HENDRYX CO., NEW HAVEN, CONN., U. S. A.

CAN BE PURCHASED FROM ANY FIRST-CLASS DEALERS IN FISHING TACKLE

**BRASS, BRONZE,
COMPOSITION and
ALUMINUM
CASTINGS, Heavy and Light.**

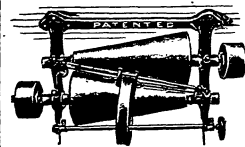
F. L. GAYLORD CO.

ANSONIA,
CONN.

Send
for
Prices.

**GENUINE
PHOSPHOR TIN,**
MANUFACTURED BY THE
**CROSBY STEAM GAGE
AND VALVE CO.**
Boston, Mass., U. S. A.
Branches: NEW YORK, CHICAGO AND LONDON.

EVANS FRICTION CONES.



For regulating the speed of machines automatically or by hand. Thousands of sets in operation driving all kinds of machinery which require from 1 to 50 H.P. Address
Evans Friction Cone Co.,
85 Water Street,
Boston, Mass.

THE CRESCENT TRY IT!
AND YOU WILL USE NO OTHER
**THE CRESCENT BRAND
PHOSPHOR
TIN.**
THE HIGHEST AND
RICHEST GRADE MADE.
MANUFACTURED ONLY BY
THE CRESCENT PHOSPHORIZED METAL CO
OFFICE AND WORKS
2107 2109 and 2111 INDIANA AV. PHILADELPHIA PA.

CROWN SMELTING COMPANY,
Chester, Pa.
Bronze, Brass and Composition Castings.
Inventors and Sole Manufacturers of
"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."
Manufacturers of PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.
Specifications in Ingot metal or castings.

The W. W. & R. M. KEYS CO.,

Bronze,
Composition
and
Brass
Castings
of all kinds,
also
Babbitt
Metals.

BRIDGEPORT, CONN.

THE WILLIAMS PRINTING CO.,

Commercial Printers AND Binders.

ESTIMATES FURNISHED FOR ALL CLASSES OF WORK.

96, 98, 100 and 102 READE STREET, - NEW YORK.

A

PHOSPHOR-TIN
BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE OF PHOSPHOR BRONZE THEMSELVES, BY THE SIMPLE PROCESS OF MELTING. MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET. NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS AND PRICE ADDRESS **HALK & NAUMANN** NEW-YORK.
SOLE AGENTS FOR THE U.S. AND CANADA, 3 PEARL

**BARBED WIRE,
PLAIN WIRE
AND WIRE NAILS.**

Quick Shipment. Write for Prices.

Indiana Wire Fence Co.,

Crawfordsville, Ind.

WASHBURN & MOEN MFG. CO.

Works: Worcester, Mass., and Waukegan, Ill.

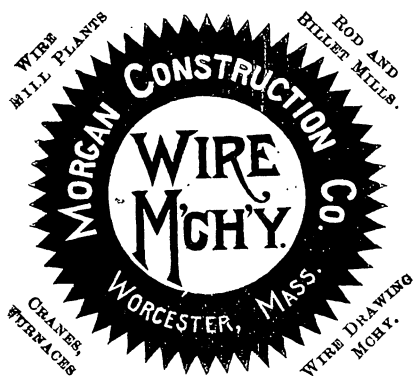
Copper
Insulated
Glidden Barbed
Waukegan Barbed

WIRE

Rods
Springs
Bale Ties
Rope and Cable.

Makers of Iron, Steel and Copper.

Warehouses: New York, 16 Cliff St.; Chicago, 107 & 109 Lake St.; San Francisco, 8 & 10 Pine St.; Houston, Texas.



The American Metal Co.

(LIMITED),

Levin Building, 80 Wall St., New York.
P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.

TIN, LEAD, SPELTER, ANTIMONY, NICKEL,
ALUMINUM, BULLION, IRON.

Advances made on Consignments.

AGENTS FOR

Henry R. Merton & Co., - - London.
Metallgesellschaft, Frankfort-on-Main.
Williams, Foster & Co., Ltd., Swansea.

AMERICAN SPIRAL SPRING CO.

MANUFACTURERS OF

ALL KINDS OF SPIRAL SPRINGS.

OFFICE AND WORKS:

Shingiss and Bluff Streets, - PITTSBURGH, PA.
TELEPHONE 705.

WM. MCFARLAND,
IRON FOUNDER,

TRENTON, - - N. J.

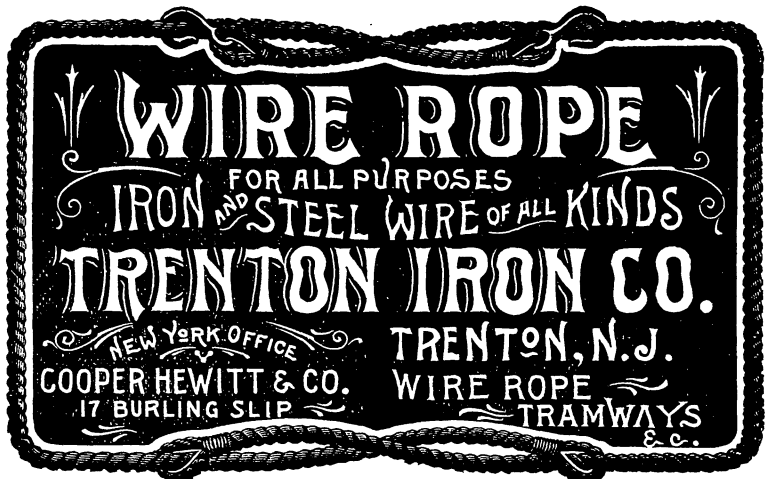
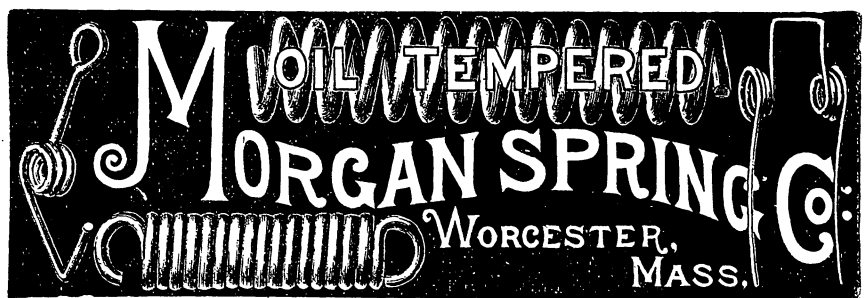
Chilled Cast Wire DIES

A SPECIALTY.

Any Size or Style Made at Short Notice.



Guaranteed.
Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal. Introduced in this country since 1891 and has displaced all Anti-Friction metals it has come in contact with. Stereotype and Electrotype Metal.
THEODORE HERTZ & SON, SOLE MFRS.,
Manufacturers Babbitt Metals, Solder, Lead Seals, &c.
30th St. & Park Ave., St. Louis, Mo.

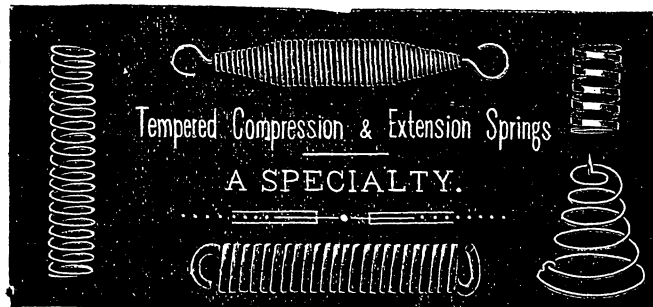


MILLER & VAN WINKLE.

MANUFACTURERS OF

STEEL WIRE AND STEEL SPRINGS.

TEMPERED STEEL WIRE.



MACHINERY SPRINGS.

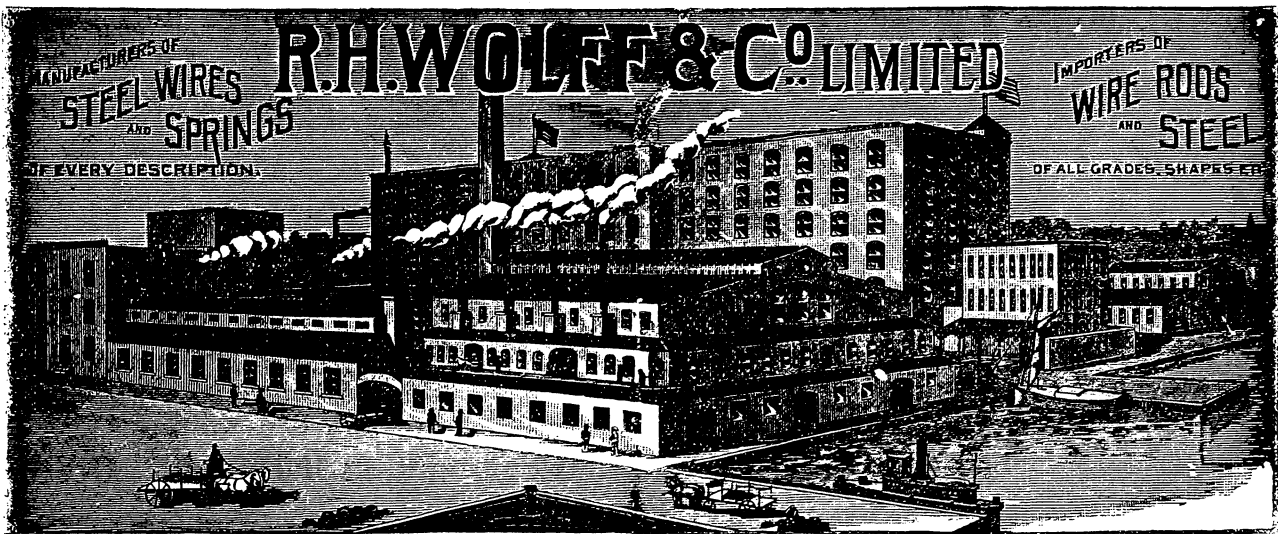
OFFICE AND WORKS: }
18 to 24 Bridge Street, } BROOKLYN, N. Y.

VOLUTE,
WIRE
and
FLAT STEEL

SPRINGS

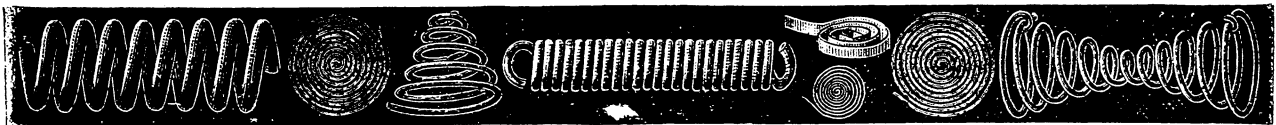
& Agricultural Implements, Machinery and various other purposes.
Write for prices to

SABIN MACHINE CO.,
MANUFACTURERS.
MONTPELIER, VT



117th to 118th Street and Harlem River.

General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

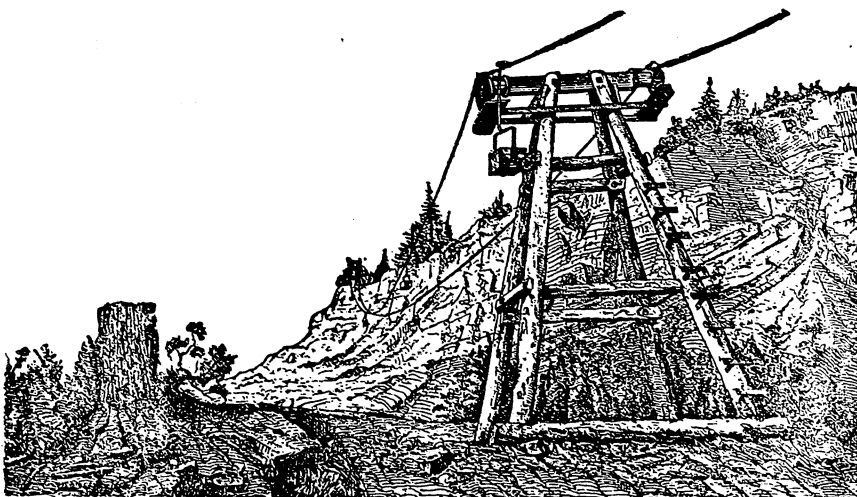
CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

CALIFORNIA WIRE WORKS,

9 Fremont Street,

San Francisco, Cal



MANUFACTURERS OF

WIRE ROPE FOR CABLE RAILWAYS AND MINING PURPOSES.

HALLIDIE'S PATENT WIRE ROPEWAY,

Simplest and most economical means of transportation. Send for Illustrated Catalogue.

THE CELEBRATED

"SILVER FINISH"

GALVANIZED POULTRY NETTINGS.

FOR SALE BY THE HARDWARE TRADE.

GET THE BEST



DUNBAR BROS.,

Manufacturers of

Clock Springs and Small Springs

of every description, from best Cast Steel,

BRISTOL, CONN.

FRED NOURSE CO.,



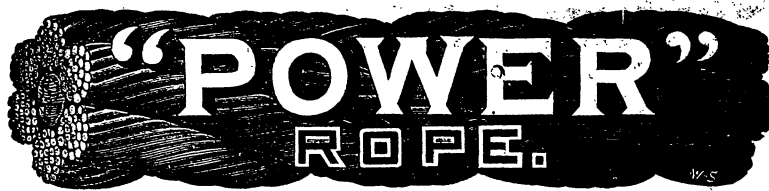
STEEL WIRE AND STEEL SPRINGS,

315, 317 and 319 East 22d St., New York.



240 & 242 W. 29TH ST. NEW-YORK

Always
Ask
For



Unequaled for Strength
and Durability.

Made Only by

Broderick & Bascom Rope Co.,
St. Louis, Mo.

HOWSON
AND
HOWSON

Counsellors at Law
Solicitors of Patents

PHILADELPHIA
Forrest Building, 119 S. 4th St.
NEW YORK
Potter Building, 38 Park Row.
WASHINGTON
Atlantic Building, 928 F St.

PATENTS

U. S. and Foreign Secured.

Trade Marks and Copy Rights. Twenty Years' Experience. Send model or sketch and brief description of your invention for Free report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement. Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents." Free.

PATENT PRACTICE EXCLUSIVELY.
References Furnished on Application.

M. B. STOCKING, Attorney at Law,
611 F ST., N. W., WASHINGTON, D. C.

PATENTS.

H. W. T. JENNER, Patent Attorney and Mechanical Expert. 519 Seventh St., Washington, D.C. Charges moderate. Write for terms. Established 1883.

SPRINGS—RIVETS.

Specialties in

SHEET METAL WORK,
CLOCK and INDICATOR POINTERS,
CLARK & COWLES, Plainville, Ct.

ELEMENTS OF COST.

By Frederick W. Child.

20 PAGES, 5 x 7 1/4 Inches.
Paper, 25 cents.

An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry.

Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller.

96-102 Reade Street, New York,

A. LESCHEN & SONS' ROPE CO.,

MANUFACTURERS OF



ST. LOUIS, MO.

CORRESPONDENCE INVITED.



Williamsport Wire Rope Co., Williamsport, Pa.



WAREHOUSES: 87 Liberty St., New York.

WORKS
Wilkesbarre, Pa.

PROMPT SHIPMENTS OF
GENERAL WIRE HARDWARE AND KITCHEN FURNISHING GOODS
SPECIALTIES

MANUFACTURED TO ORDER.

EVERYTHING IN WIRE.

THE WIRE GOODS COMPANY, - WORCESTER, MASS

NEW HAVEN WIRE MFG. CO.,

Manufacturers of **WIRE** in great variety.

NEW HAVEN.

CONN.

Wire Cloth AND Wire Goods

Hardware Grade and
Fanning Mill Wire Cloth,
Poultry Netting, Heavy
Window Screen Wire
Cloth, Coal and Sand
Screens, Riddles, Ash
Sieves, &c., &c.



Office and Counter
Railings, Elevator En-
closures, Wire Stall
Guards, Hay Racks
Feed Boxes, Window
Guards, &c., &c.

BUFFALO, N. Y.

BOOKS

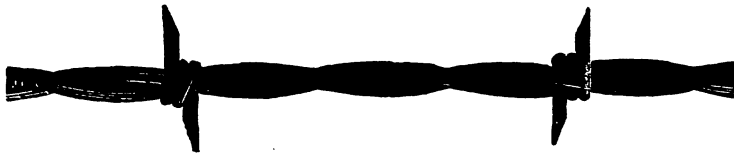
THE NEWEST BOOKS ON Metal Working, Iron, Steel and Metallurgy; Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting; Draftsmanship, Architecture and Building, promptly supplied on receipt of price. SEND FOR CATALOGUES, mentioning the kind of books you are looking for.

DAVID WILLIAMS, 96-102 Reade St., New York.

HOWARD & MORSE
45 FULTON ST.,
NEW YORK.
HEAVY MINING
COPPER,
BRASS,
STEEL
OR IRON
WIRE CLOTH.

ALSO
 MANUFACTURERS OF
GENERAL
WIRE WORK.
 Window Guards,
 Stable Fixtures,
RAILINGS,
 Sand Screens
 Coal Screens
 Etc.

BARBED WIRE.



Prompt shipment made direct from our Warehouses.

BALE TIES, FENCE WIRE,
STAPLES, WIRE NAILS.
 WRITE US FOR PRICES.

LUDLOW-SAYLOR WIRE CO., St. Louis, Mo.
WICKWIRE BROTHERS, CORTLAND, N. Y.
 Wire Cloth and Wire Goods,
MANUFACTURERS OF



Coal Sieves,
 Flour Sieves,
 Corn Poppers,
 Dish Covers,
 Metallic
 Coal Sieves.

NEW PROCESS
Cortland
POWER LOOM
WIRE CLOTH.

Every roll wrapped in Pink Paper
 and has our name on label.



Mention The Iron Age.

PROTECT

Your Offices, Stores and Warehouses from fire
 and burglars by using

Metallic Doors and Shutters

Made from wood and covered with iron or steel, rendering them stiff and preventing warping in case of fire.
 Made from heavy boiler plate iron.
 Made from double corrugated iron or steel.
 Made to fit any size opening.

Estimates furnished upon application.

GARRY IRON & STEEL ROOFING CO.,
CLEVELAND, OHIO

THE VAN DORN IRON WORKS CO., Cleveland, Ohio.



Office and Salesroom, 157 1/2 Euclid Ave.,
 MANUFACTURERS OF
WROUGHT IRON FENCE AND RAILING.
 Stable Fixtures, Crestings, Terminals, Wire Office and
 Counter Railing, Lawn Seats and Vases.
 Iron and Steel Jail Cell Work. Ornamental and Structural Ironwork.

The Leading Authority on
 Business Law.

PARSONS' THE LAWS OF BUSINESS,

For all the States and Territories of
 the Union.

By Theophilus Parsons, LL.D.

864 pages, 6 x 9 inches: full leather\$4.50

This is a work almost indispensable to every business man, as a guide in transactions which are occurring constantly.

It constitutes a library of law on daily business affairs and is used for constant reference by many of the leading concerns throughout the country.

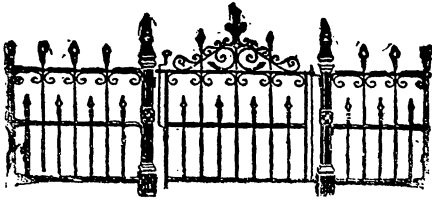
The volume treats fully and clearly of contracts, sales, agency, agreements and assessments, stoppage and transitu, considerations, limitations, notes and bills of exchange, interest and usury. Embraces chapters on commercial law in general, bonds, assignments, guaranty, the statute of frauds, receipts and releases, payment, partnership, arbitration, carriage of goods and passengers by railroad and other carriers, hotel keepers, patents, copyrights, statute of limitations, the law of place, shipping, marine, fire and life insurance, deeds of land, mortgages of land, mortgages of personal property, leases, liens of mechanics and material men, the recovery of debts, wills, executors and administrators, guardians, and the legal rights of farmers, &c. Also abstracts of the laws of all the States and Territories relating to the collection of debts, usury, the execution and acknowledgment of deeds, witness required to wills, holidays and days of grace, mechanics' liens, chattel mortgages, and nearly 300 approved forms which have been tested in courts.

Sent prepaid on receipt of price by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 READE ST., NEW YORK.

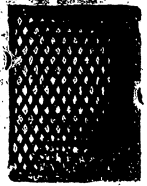


Reliance Wire & Iron Works, MILWAUKEE, WIS.

ARCHITECTURAL WIRE AND IRON WORKERS.

Wire Cloth, Galvanized Fencing and Netting, Wire Lath, Wire and Iron Fences and Railings, Window Guards, Stable Fixtures, Bank and Office Railings, all kinds of Brass, Wire and Iron Work for Buildings and Offices.

SEND FOR ILLUSTRATED CATALOGUE.



CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

Perforated Metals. GALVANIZERS AND TINNERS OF Wire Cloth and Nettings.

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street

The Gilbert & Bennett Mfg. Co.

— MANUFACTURE —

Pearl Window Screen Wire Cloth.
Galvanized Steel Wire Cloth.
Galvanized Wire Poultry Netting.
"Cottage" Lawn & Garden Fencing.
The World's Web Wire Fencing.
Sieves, Riddles, Screens.
Gilbert's Rival Ash Sifters.
House Furnishing Wire Goods.

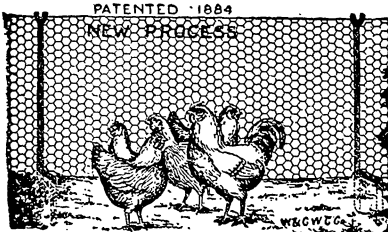
WIRE CLOTH, NETTING,
Fencing, Gates, Fencing Tools,
Wire Goods, Wire Work
RAILINGS, WINDOW GUARDS.
WIRE LATHING WITH HAMMOND'S METAL FURRING.

44 Cliff Street,
NEW YORK.

148 Lake Street,
CHICAGO.

Factories, { GEORGETOWN, CONN.
CHICAGO, ILLINOIS.
ESTABLISHED 1818.

WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



HARD STEEL WIRE

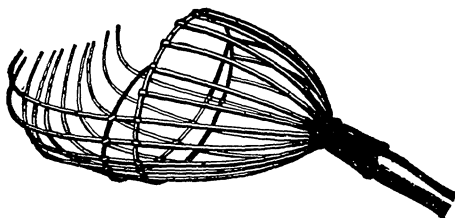
NEW PROCESS
HARD STEEL WIRE CLOTH AND NETTING
GALVANIZED
WIRE NETTING. Painted Window Screen Wire Cloth,

Patented March, 1884.
Patents Pending.

WIRE LATHING, HOUSE FURNISHING WIRE GOODS

SEND FOR LATEST CATALOGUE.

"PENNSYLVANIA" FRUIT PICKER.



This Cut almost speaks for itself—the device being so much like the human hand shows at once the utility of the article

AS A FRUIT PICKER IT HAS NO SUPERIOR.

It is made of Heavy Galvanized Wire, and easily adjusted to a pole.
It has been sold for several years, and the demand (as it is becoming known) is steadily increasing.

The difficulty of detaching fruit and securing it unbruised is apparent to every one so engaged. This overcomes the difficulty, and saves the finest fruit, which commands the highest prices.

THE LOW PRICE AT WHICH IT IS SOLD

Brings it within the reach of those who have but little fruit to gather as well as those who have large quantities.

Price per dozen, \$6.00.

It will gather Apples, Peaches, Pears, Etc.

MANUFACTURED BY **PENNSYLVANIA WIRE WORKS,**

EDWARD DARBY & SONS, - 233-235 Arch St., Phila., Pa.

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS
**THE ROEBLING
STANDARD
WIRE
LATHING.**

**NEW JERSEY
WIRE CLOTH CO.**

**"JERSEY"
POULTRY
NETTING
AND FARM
FENCING.**

TRENTON, 117 and 119 LIBERTY STREET,
NEW JERSEY.

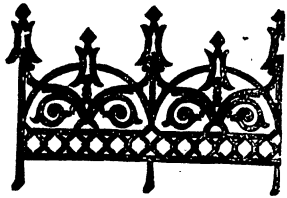
NEW YORK.

171 and 173 LAKE STREET,
CHICAGO

25 and 27 FREMONT STREET,
SAN FRANCISCO.

FOUNDERS **P. P. EMORY MFG. CO.**
 IN BRASS AND COM-
 POSITION, HEAVY
 AND LIGHT CAST-
 INGS.

— ESTABLISHED 1850. —
SPRINGFIELD, MASS.
Good Work, Fair Prices.
CORRESPONDENCE SOLICITED.



ROOF CRESTING.

Builders' Wire and Iron Work, Counter Railing, Stable Fixtures, Iron Fencing, Window Guards, Columns, Stairs, Jail Cells, Etc.

CATALOGUE FREE.

E. T. BARNUM, - - DETROIT, MICH.

MENTION THIS PAPER.

The Perfect Lawn Fence. Cheap as Wood.

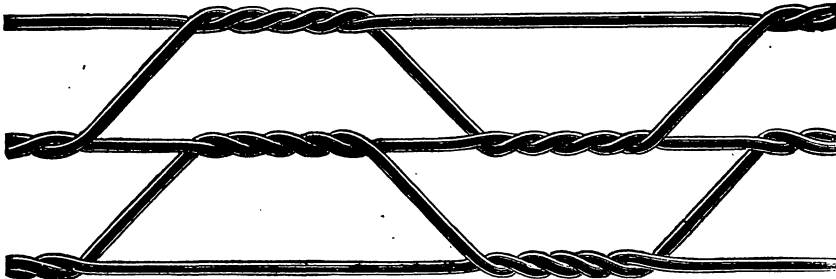


HARTMAN MFG. CO., - Works, Ellwood City, Lawrence Co., Pa.

BRANCHES { 277 Broadway, New York.
 73 S. Forsyth St., Atlanta Ga.
 508 State St., Chicago, Ill.

WRITE FOR CATALOGUE AND PRICES.

STEEL WIRE FENCE BOARD.



STRONGEST AND CHEAPEST BARBLESS FARM FENCING.

Write for Circular of above, and Steel Web Picket Fence.

DEKALB FENCE CO., - - DeKalb, Ill

AGENCIES: Eastern—HICKS & DIOKEY, Philadelphia, Pa. Southern—W. R. BELKNAP & Co. Louisville, Ky. Western—WYETH HARDWARE & MFG. CO., St. Joseph, Mo. In Iowa and Mich-igan—INDIANA WIRE FENCE CO., Crawfordsville, Ind. Texas—G. K. MERIWETHER, Dallas.

Kilmer Manufacturing Co.

—Newburgh, N. Y.

Manufactur-
ers of

BALE TIES

For Baling
Hay, Straw,
Rags,
Excelsior, &c.

ALSO WIRE RODS, BARB WIRE, COILED STEEL WIRE, WIRE STAPLES, GALVANIZED WIRE, ORNAMENTAL FENCING, &c., &c.

Western Warehouse, 543 and 545 State Street, Chicago, Ill.

Western Office 21 Quincy Street, Chicago, Ill.

New York Office, 111 Water Street, New York City.

Works and General Office, Newburgh, N. Y.

Our Galvanized Roofing

Will Outlast your Building. It is Rain, Rust, and Fire-Proof, and Cheaper now than ever before.

Needs No Paint.

Our little book:
"The Life of an Iron Roof, or
How long will it last," sent free.

THE CINCINNATI CORRUGATING CO.
BOX Q, PIQUA, OHIO.

COPPERSMITHS,
 and Manufacturers of
COPPER AIR CHAMBERS,
EXPANSION PIPES
AND COILS.

CHAMPION IRON CO.

SPECIALTIES.



Iron Stairs and Jail Work, Builders' and Ornamental Iron Work and the only manufacturers of Malleable Iron Cresting guaranteed against breakage; also manufacturers of the

Celebrated Ohio Champion Iron Force and Lift Pumps.

Send for 166-page Catalogue.

Largest Iron Fence and Railing Works in U. S.

KENTON, - OHIO.

W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,

MANUFACTURER OF

WIRE CLOTH

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c.,

—AND—

WIRE WORK

For Banl. Office and Counter Railing, Store Fronts Window Guards, &c.

Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.

S T Pat. Adjustable Foundry Riddles.

S T Sand Screens.

SEND FOR CATALOGUE.

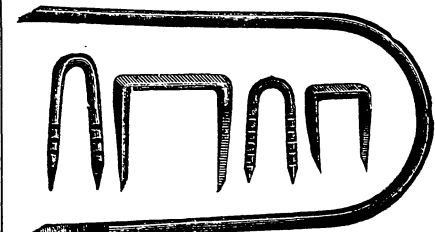


Buckeye Wrought Iron Punched Rail Fence. Also manufacturers of Iron Cresting, Iron Turbine and Buckeye Wind Engines, Buckeye Force Pumps, Buckeye, Globe and Champion Lawn Mowers. Send for Illustrated Catalogue and Prices to
MAST, FOOS & CO. SPRINGFIELD, O.

E. H. Titchener & Co.,

BINGHAMTON, N. Y.

—MANUFACTURERS OF—



STAPLES in All Varieties,

Double-Pointed Tacks, Bed Links, Etc.

Blind Staples a Specialty.

PHILLIPS, TOWNSEND & CO.,

North Penn Junction, Philadelphia.

WIRE NAILS, - - -

- - NORWAY RIVETS.

Rivets marked "P" are not of our make. We make only first-class NORWAY IRON RIVETS.

The Berlin Iron Bridge Co.,

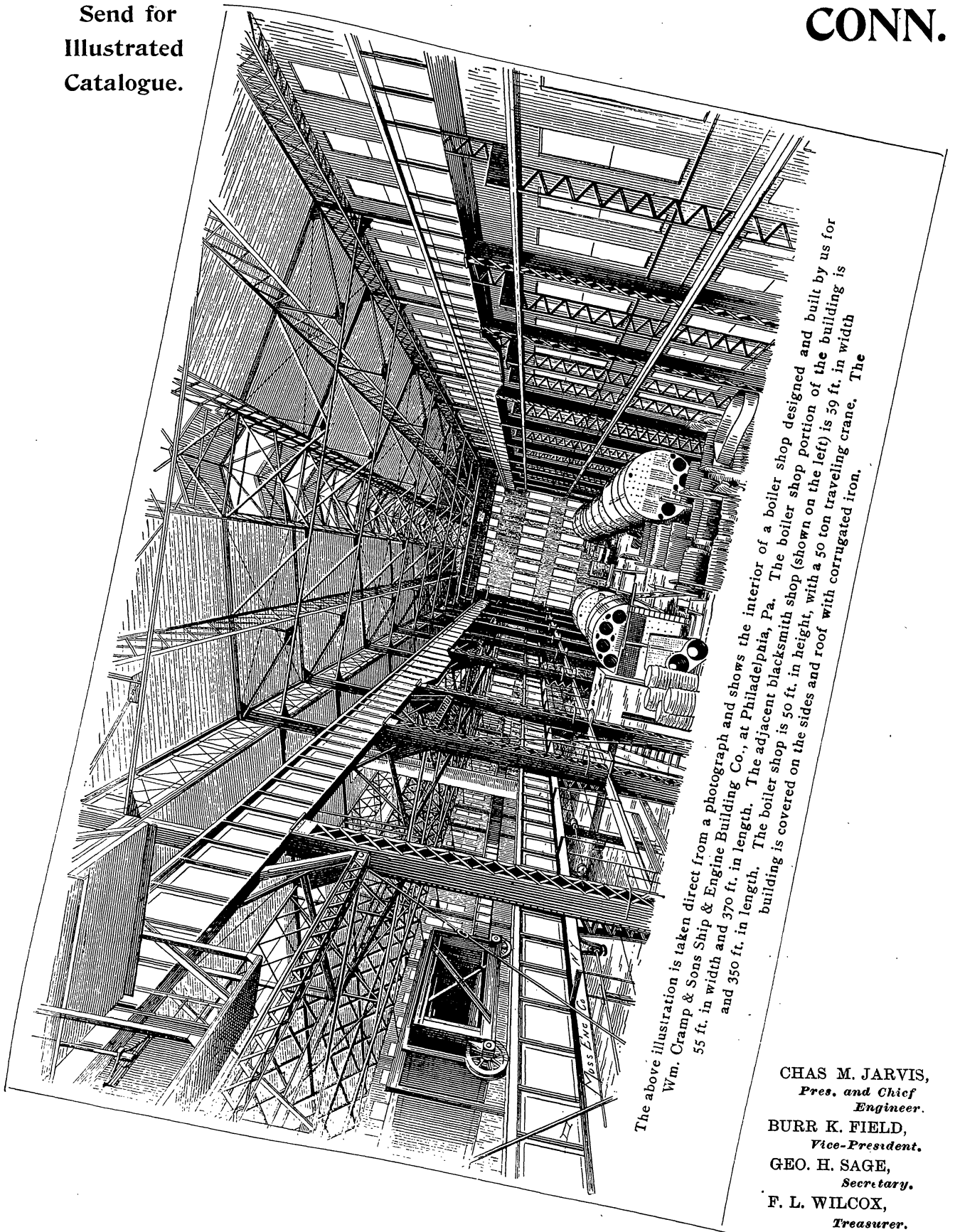
Engineers, Architects and Builders in Iron and Steel.

Office and Works, No. 5 Railroad Avenue,

EAST BERLIN,

CONN.

Send for
Illustrated
Catalogue.



The above illustration is taken direct from a photograph and shows the interior of a boiler shop designed and built by us for Wm. Cramp & Sons Ship & Engine Building Co., at Philadelphia, Pa. The boiler shop portion of the building is 55 ft. in width and 370 ft. in length. The adjacent blacksmith shop (shown on the left) is 59 ft. in width and 350 ft. in length. The boiler shop is 50 ft. in height, with a 50 ton traveling crane. The building is covered on the sides and roof with corrugated iron. The

CHAS. M. JARVIS,
Pres. and Chief
Engineer.
BURR K. FIELD,
Vice-President.
GEO. H. SAGE,
Secretary.
F. L. WILCOX,
Treasurer.

STEEL, IRON, COPPER, ZINC, BRASS AND TIN PERFORATED.

—FOR—

Grain Cleaning Machinery;
Woolen, Cotton, Paper Pulp, Rice,
Flour and Oil Mills;
Distilleries, Sugar and Malt Houses;
Gas, Water, Brick and Tile Works, Filters, Ventilators, &c;
Oil, Gas and Vapor Stoves, Lanterns, Lamps, etc.

Perforated Filter Press Plates

For Paraffine Wax, Cotton-Seed Oil, Sugar and other purposes.



Screen Plates for Coal, Coke, and Ore Separators, Jigs, Trommels, Washers and Sizers.

Heavy Steel and Iron Plates and Cylinders for Coal and Coke Breakers, Ore, Stone, Phosphates & Gravel Screens.

For Railroads, Locomotive and Car Builders.

Prices and Samples on Application.

ALUMINUM or MANGANESE BRONZE
SCREEN PLATES
TO WITHSTAND ACTION OF
ACIDULATED WATERS
WITH
Hardness and Life of
Best Steel.

THE HARRINGTON & KING PERF. CO.,
Main Office & Works, 224 to 240 Union Street, CHICAGO, ILL., U. S. A.
Eastern office, No 284 Pearl St., New York.

HENDRICKS' ARCHITECTS AND BUILDERS' GUIDE

—:AND:—

CONTRACTORS' DIRECTORY OF AMERICA

—:FOR:—

BUILDERS, CONTRACTORS, MANUFACTURERS

AND DEALERS IN ALL KINDS OF

BUILDING SUPPLIES.

A Complete Directory of all the Construction Industries of the Country, containing over 170,000 Names. Addresses and Business Classifications, comprising Builders and Contractors of Material and Construction in the Building and kindred Industries. With Full lists of the Manufacturers of and Dealers in Everything employed in the

Manufacture of Material and Apparatus used in these Industries—from the Raw Material to the Manufactured Article, and from the Producer to the Consumer.

Architects; Arch'l Wood Workers; Car Builders; Carpenters; Builders and Contractors of all kinds; Blast Furnaces; Brick Mfrs. (Common, Fire, Ornamental, Paving, Pressed, &c.); Boiler Mfrs.; Bridge Builders; Builders' Hardware; Mfrs. of Building Iron of all kinds; Cement, Cornices; Dumb Waiters; Engine Mfrs.; Engine and Boiler Dealers; Electric Lighting Co.'s Dynamos and Motors; Elevators; Engineers (Civil and Mechanical); Electricians; Fire Escapes; Furnaces; Fire Proof Building Material; Dredging Machinery and Contractors; Dock Builders; Contractors for Railroads (Steam, Electric, Elevated, Cable, Street, &c.); Granite Producers, Dealers and Workers; Granite and Marble Monument Workers and Dealers; Iron and Steel Ceiling and Siding; Iron and Steel Roofing; Lathing (Iron, Steel and Wire); Lightning Rods; Mantel Mfrs. (Iron Marble, Onyx, Slate, Wood, &c.); Mantels, Grates, Fenders, Tile, &c.; Marble Producers, Marble Dealers and Workers; Mason and Builders' Materials; Paint Mfrs.; Paint, Oil and Glass Dealers; Plumbers' Specialties; Plumbers, Gas and Steam Fitters; Plumbers' Gas and Steam Fitters' Supplies; Roofers and Roofers' Supplies; Steam Supplies (Gauges, Feed Water Heaters, Traps, Valves, Pipe and Boiler Coverings, Cast and Wrought Iron Pipe and Fittings); Steam and Hot Water Heating Apparatus; House Heating Boilers and Heaters; Steam and Hot Water Heating Contractors; Railroad Purchasing Officials; Radiators; Rolling Mills, &c.; Sashes, Doors and Blinds; Skylights; Stone Dealers; Terra Cotta; Varnishes; Ventilators; Vault and Sidewalk Lights; Weather Vanes; White Lead Mfrs.; Wire Mfrs. and Workers; in fact everything connected with the Building Industries.

FOR THE YEARS 1893-94.

PRICE . . . FIVE DOLLARS.

SENT, POSTPAID, ON RECEIPT OF THE PRICE, BY

DAVID WILLIAMS, Publisher and Bookseller,
96-102 Reade Street, N. Y.

ATLAS TACK CORPORATION.**508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

BRANCHES: **DUNBAR, HOBART & CO., WHITMAN, MASS.** ESTABLISHED IN 1810. **LORING & PARKS, PLYMOUTH, MASS.** ESTABLISHED IN 1842.
A. FIELD & SONS, TAUNTON, MASS. ESTABLISHED IN 1827. **TAUNTON TACK CO., TAUNTON, MASS.** ESTABLISHED IN 1854.
AMERICAN TACK CO., FAIRHAVEN, MASS. ESTABLISHED IN 1867. **OLD COLONY RIVET CO., PLYMOUTH, MASS.** ESTABLISHED IN 1866.

MANUFACTURERS OF

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York store and our factories.

MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.**BRANCH OFFICE & WAREHOUSE, 31 WARREN ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 239 & 241 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 406 COMMERCE ST., PHILADELPHIA, PA.****THE NATIONAL SCREW AND TACK CO.,**

—MANUFACTURERS OF—



Wood Screws, Machine Screws, Stove
Bolts, Tire Bolts, Sink Bolts, Tacks,
Trunk, Clout and Small Nails.

CLEVELAND, OHIO.

Tacks, Wire Nails and Brads, Hoop
Nails, Staples, Silver and Japanned Lining
and Saddle Nails, Double Pointed Tacks,
Slating and Roofing Nails.

**BONNIE BLUE
TACKS.**
100 Kegs in a Box,
Assorted 3 to 12 oz.
Retail 2 Kegs for 5
cents.

**PARISIAN GILT
NAILS.**
20 papers in Car
ton. 5 cent seller.

**MONARCH WOOD
KEG CARPET
TACKS.**
5 cent seller.

"JUST ENOUGH"
Brass Nai's. 100
Nails in a Paper, just
enough to top a pair
of shoes; 20 papers in
Carton. 5 cent seller.

DOUBLE ENOUGH
Cobblers' Nails. 200
Nails in a Paper, 20
Papers in Carton. 5
cent seller.

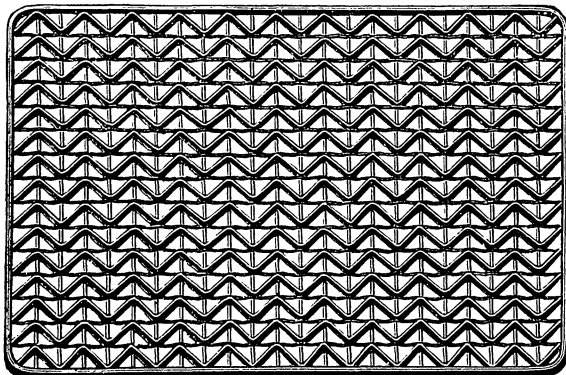
BILL NYE BRAD BOX.

168 Papers Wire Brads, a sorted 1/2 to
2 in Each Paper just right to retail for
5 cents.

QUARTER SIZE CUT OF



**GRAND CROSSING,
TACK CO. CHICAGO, ILL. U.S.A.**

**Horrock's Metal Mat,**

Patented July 13, 1893.

MANUFACTURED BY

JOSHUA HORROCKS,**45 CLIFF STREET - NEW YORK CITY, N. Y.**

It has more superior qualities than any mat made. Its advantages can readily be seen by its construction. It will not break or wear out, and is considered by impartial judges to be the best now on the market. It sells on sight and is galvanized after made and is reversible. Suitable for Elevated or Surface cars, and is recommended by the best medical authorities. Made in 8 sizes.

No. 1, Size 16x24. No. 2, Size 18x30. No. 3, Size 22x36. No. 4, Size, 24x48.
 " 5, " 30x48. " 6, " 36x48. " 7, " 36x60. " 8, " 36x72.

Extra Sizes Made to Order.

Send for Price-List.

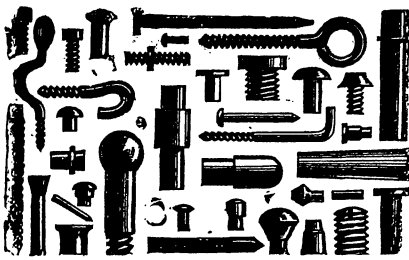
METAL PLATE WORK. Its Patterns and Their Geometry.

Also notes on metals and rules in mensuration for the use of tin, iron and zinc plate workers, &c.

By C. T. MILLIS. Second edition, revised and enlarged. 377 pages, 314 illustrations.

12mo, Cloth, . . . \$3.50.

sent postpaid, upon receipt of price by **DAVID WILLIAMS Publisher and Bookseller 96-102 Reade St., N. Y.**



IRON AND BRASS RIVETS,

STUDS, PINS, SCREWS, &c.,

For Manufacturers of Light Hardware.

BLAKE & JOHNSON, WATERBURY, CONN.

NEW CASTLE WIRE NAIL CO.,

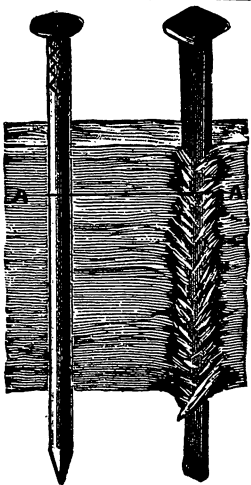
MANUFACTURERS OF



WIRE RODS AND WIRE.

Office and Works,

NEW CASTLE, PA.



THE SALEM WIRE NAIL CO.

MANUFACTURERS

WIRE NAILS

Works: SALEM, O.; FINDLAY, O.

General Office: - SALEM, OHIO

BRANCH OFFICES:

Room 28, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

REYNOLDS & CO.,

MANUFACTURERS OF

SET, CAP AND MACHINE SCREWS,

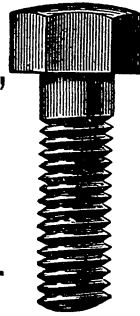
STUDS, COUPLING BOLTS, STOVE BOLTS, FINISHED NUTS, &c.



3-8



5-16



3-8

Also Hand and Draw-Plate Moulding Machines for Foundry Use.

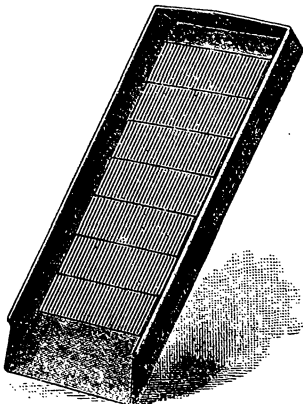
NEW HAVEN CONN.

Send for Catalogue.

FLANGE STEEL SCREENS

OF PERFORATED METAL

For SAND, GRAVEL, COAL and ORE.



THE HENDRICK MFG. CO., LTD.,
CARBONDALE, PA.

COBB & DREW,

PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers, D. P. Tacks and Staples.

New York Agency, James S. Henderson, successor to Disosway & Henderson, Hardware.

Agents for Philadelphia Star Carriage and Tire Bolts.

Corrugated, Crimped and Clap-Board Iron Roofing & Siding



Iron Buildings, Roofs, Doors, Shutters, Cornices Skylights, Bridges, &c.

MOSELEY IRON BRIDGE AND ROOF CO.,

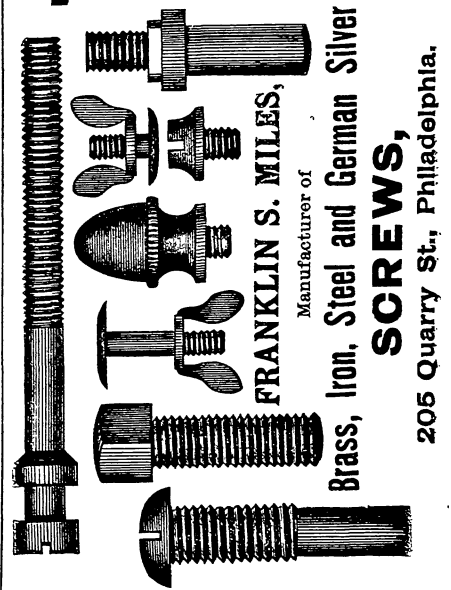
Office, 5 Dey Street, Room 13, NEW YORK.

H. PHILLIPS & SONS
SOUTH HANOVER, MASS.

TACKS

F. R. EMMONS & BRO.

21 WARREN ST., NEW YORK.



FRANKLIN S. MILES,

Manufacturer of

Brass, Iron, Steel and German Silver

SCREWS,

205 Quarry St., Philadelphia.

BORDEN & LOVELL,

70 AND 71 WEST STREET
NEW YORK.

Steel, Iron and Wire Nails.

OXFORD

IRON AND NAIL CO.,

Cut Nails

AND

SPIKES.

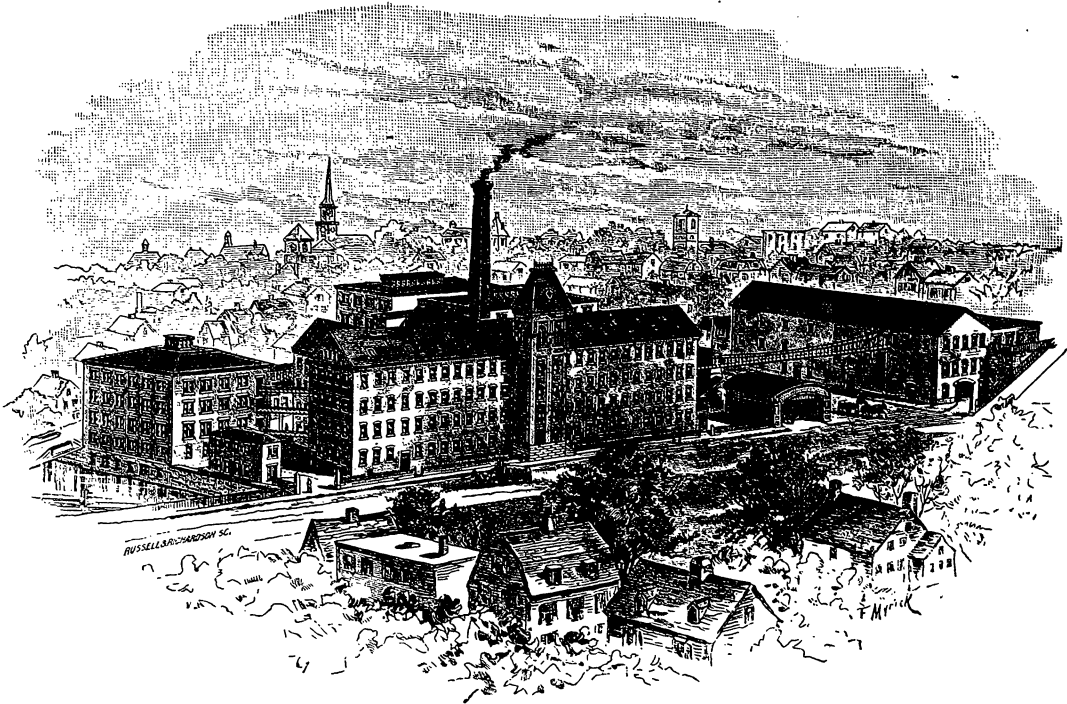
J. S. SCRANTON, Sales Agent,

81, 83 and 85 Washington Street,

NEW YORK.

American Screw Company,

PROVIDENCE, R. I.



BAY STATE MILL, PROVIDENCE, RHODE ISLAND, U. S. A.

— MANUFACTURERS OF —

WOOD SCREWS,

In Iron, Brass, Bronze and all Varieties
of Finish.

COACH SCREWS,

MACHINE SCREWS,

RAILROAD SCREWS,

HAND RAIL SCREWS,

SIDE KNOB SCREWS,

LOCK CAP SCREWS,

DOWEL SCREWS,

CHANDELIER SCREWS,

RIVETS, BURS,

TIRE BOLTS,

STOVE BOLTS,

SLEIGH SHOE BOLTS,

SINK BOLTS,

STOVE RODS,

POINTED WIRES,

TAPPED NUTS,

WIRE NAILS,

DOWEL PINS,

TAPS FOR MACHINE SCREWS,

TAPS FOR STOVE BOLTS.

**COLD
FORGED**

Rogers Drive Screws,
Side Knob Screws,
Lock Cap Screws,
Machine Screws,
Stove Bolts,
Forged Wood Screws,
Threaded Wires,
Fluted Tire Bolts.

American Screw Company,


PROVIDENCE, R. I.

Chicago Store, No. 19 Lake St.

EUROPEAN AGENTS, THOMAS & STIRLING, Liverpool.

CONSOLIDATED STEEL AND WIRE CO.

GENERAL OFFICES, THE ROOKERY, CHICAGO, ILL.

Branch  Offices. { ST. LOUIS, MO., 1935 Papin Street.
PITTSBURGH, PA., Westinghouse Building.
NEW YORK CITY, N. Y., Havemeyer Building.
SAN FRANCISCO, CAL., 81 Crocker Building.

BARBED WIRE.

WIRE RODS and PLAIN WIRE of Every Description.

WIRE NAILS.

Bale Ties, Fence Staples, etc.

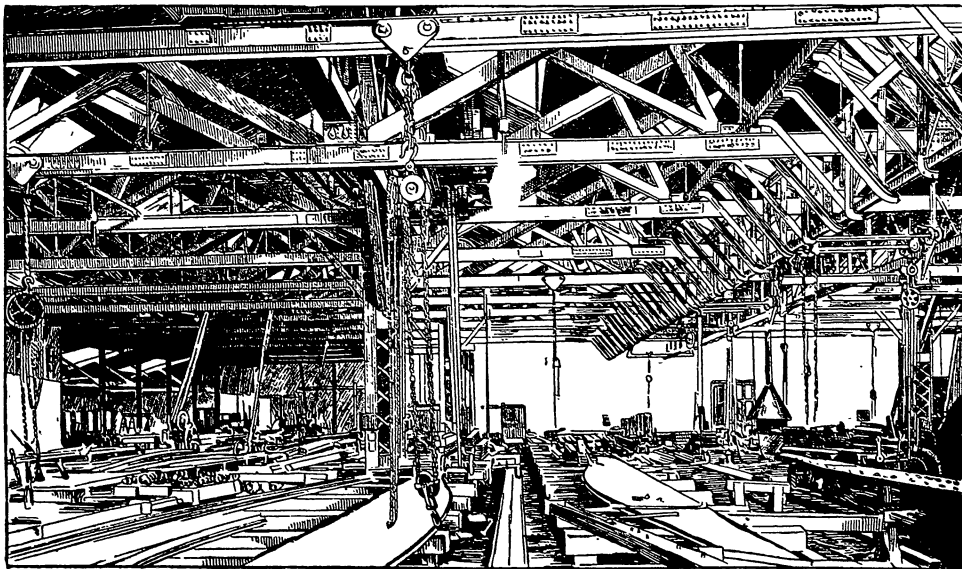
MILLS LOCATED AT

ST. LOUIS, MO. PITTSBURGH, PA. ALLENTOWN, PA.
JOLIET, ILL. LOCKPORT, ILL.

WROUGHT IRON BRIDGE CO. {

CANTON, OHIO.
NEW YORK CITY.
CHICAGO, ILL.
KANSAS CITY, MO.

COMMUNICATE WITH NEAREST OFFICE.



Iron Buildings, Roofs and
General Structural Work
in Iron and Steel, Ma-
chine Shops, Foun-
dries, Power
Houses, &c.

The above is a cut of our new works. The main building is 256 feet square and is fitted with improved machinery for handling all classes of Bridge and Structural work. All machinery is operated by electricity from our own plant.

Catalogue of Books,

Including the principal works on Metallurgy,
Mineralogy, Engineering, Electricity, Mechanics,
&c., sent free to any address by

DAVID WILLIAMS, Publisher,
96-102 Reade Street, NEW YORK.

Established 1830.

THE PLYMOUTH MILLS.
Rivets, Trunk Nails,
Tacks, Clout Nails,
Burr, Wire Nails.
PLYMOUTH, MASS.

New and Standard Books

- ON -

METALLURGY.**Wedding's Basic Bessemer Process.**

Translated from the German by WILLIAM B. PHILLIPS, PH.D., and ERNST PROCHASKA, Met. E. With supplementary chapter on De-phosphorization in the Basic Open-Hearth Furnace. 222 pages; cloth; illustrated. \$3.50

A Treatise on the Metallurgy of Iron.

Containing outlines of the history of iron manufacture, methods of assay and analyses of iron ores, processes of manufacture of iron and steel, &c. By H. Bauerman, F. G. S., associate of the Royal School of Mines. Fifth edition, revised and enlarged. Illustrated with numerous wood engravings from drawings by J. B. JORDAN. 515 pages; cloth. \$2

The Metallurgy of Steel.

Volume I. By HENRY M. HOWE, A.M., S.B. mining and metallurgical engineer; illustrated with many engravings and plates. 383 pages; 11 x 14 inches. \$10

Handbook for Charcoal Burners.

Translated from the Swedish of G. Svedelius by PROF. R. B. ANDERSON, and edited with notes by PROF. W. J. L. NICODEMUS, C.E.; 23 wood engravings; 217 pages; cloth. \$1.50

The Metallic Alloys.

A practical guide for the manufacture of all kinds of alloys, amalgams and solders, used by metal workers; together with their chemical and physical properties and their application in the arts and the industries; with an appendix on the coloring of alloys. Translated and edited chiefly from the German of A. KRUPP and ANDREAS WILDBERGER, with extensive additions by Wm. T. BRANNT; illustrated by 16 engravings; 428 pages; cloth. \$2.50

The Metal Worker's Handy Book of Receipts and Processes.

Being a collection of chemical formulas and practical manipulations for the working of all the metals and alloys, including the decoration and beautifying of the articles manufactured therefrom, as well as their preservation. Edited from various sources by WILLIAM T. BRANNT. 530 pages; cloth. \$2.50

Electro-Plating.

A practical hand-book on the deposition of copper, silver, nickel, gold, aluminum, brass, platinum, &c. With descriptions of the chemicals, materials, batteries and dynamo machines used in the art. Second edition; carefully revised, with additions. By J. W. URQUHART; 220 pages; cloth. \$2

Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mills, the forge and the foundry. By WILLIAM HENRY GREENWOOD, F.C.S. With 97 diagrams; 536 pages; cloth. \$2

Aluminum.

Its history, occurrence, properties, metallurgy and applications, including its alloys. By JOSEPH W. RICHARDS, M.A., A.C., instructor in metallurgy at the Lehigh University. Second edition, revised and greatly enlarged. Illustrated by 23 engravings and two diagrams; 511 pages; cloth. \$5

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller.

96-102 Rensselaer St., New York.

Gautier Steel Department of Cambria Iron Co.,

JOHNSTOWN, PA.

—: MANUFACTURERS OF:—

MERCHANT BAR STEEL:

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

AGRICULTURAL STEEL AND SHAPES:

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

PLOW STEEL:

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

COLD ROLLED STEEL SHAFING.**STEEL HARROW DISCS.****CAMBRIA LINK BARB WIRE.**

New York Office,
102 Chambers St.

Philadelphia Office,
S. W. Cor. 5th & Commerce Sts.

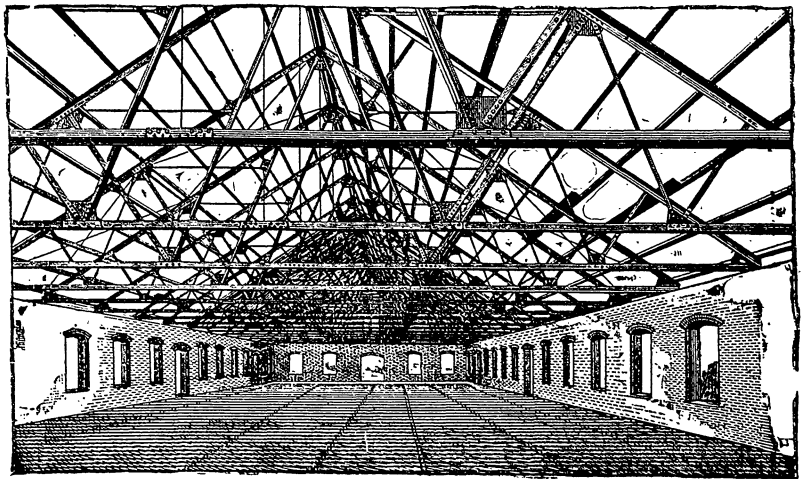
Chicago Office,
209 Phenix Building.

Southern Office,
Chattanooga, Tenn.

IRON AND STEEL BRIDGES, ROOFS AND BUILDINGS**BOSTON BRIDGE WORKS,**

Engineers and Builders,

MASON BUILDING, BOSTON, MASS.



Roof of Machine Shop at Portsmouth (N. H.) Navy Yard.

INQUIRIES SOLICITED.

D. H. ANDREWS, Prop'r.
J. R. WORCESTER, Chief Eng'r.

A. S. MILLER, Jr., Sec'y.
R. H. BROWN, Con. Eng'r.

H.W. JOHNS' ASBESTOS LIQUID PAINTS

SEND FOR SAMPLE CARD AND DESCRIPTIVE PRICE LIST.

H. W. JOHNS' MANUFACTURING CO.,

Sole Manufacturers of H. W. Johns' Asbestos Roofing, Sheathing, Building Felt, Asbestos Steam Packings, Boiler Coverings, Roof Paints, Fire Proof Paints, etc.

VULCABESTON Moulded Piston-Rod Packing Rings, Gaskets, Sheet Packing, etc.

Established 1858.

87 MAIDEN LANE, NEW YORK.

PHILADELPHIA, CHICAGO,
BOSTON, LONDON.

IRON AND STEEL ROOFING,

Corrugated Iron, Galvanized Eave Trough and Conductor Pipe, Roofing Paints, etc.

Cambridge Roofing Co., Cambridge, O.

Lukens Iron and Steel Co. INCORPORATED 1890.

The First to make Boiler Plates in America.

Chas. Huston, Pres. A. F. Huston, Vice-Prest. C. L. Huston, Genl. Mgr. Robt. B. Haines, Jr., Secy. Jos. Humpton, Treas.

STEEL AND IRON PLATES, ALSO SHEETS

TO EXTREME DIMENSIONS. WIDTHS UP TO 10 FEET. THICKNESS, No. 12 GAUGE TO 1 1/4 INCHES.

—ESTABLISHED 1810.—

WORKS:

Coatesville, Pa.

NEW YORK OFFICE:

No. 29 Broadway.

PHILADELPHIA OFFICE:

62 & 64 Bullitt Bldg.

FRANK SAMUEL,
136-138 So. 4th St.,
Philadelphia.

LOW PHOSPHORUS

PIG IRON—.03 or under.
SCRAP—.03 or .05 or under.
ORE—For O. H. and Furnace Use.
MELTING BAR—
Open Hearth and Bessemer Billets,
Skelp, Muck Bars and Scrap, Foundry
and Bessemer Pig Iron.
Syracuse Tube Co.'s Tubes and Pipe.

THE PHOENIX IRON CO., 410 Walnut St., Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

WROUGHT IRON AND OPEN HEARTH STEEL.

Beams, Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.

SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes, Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS; JAMES B. STOKES, 132 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

TESTED CHAINS.

BRADLEE & CO., - EMPIRE CHAIN WORKS,

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging, Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

S. T. WELLMAN, President. J. H. ROOP, Treasurer. C. H. WELLMAN, Superintendent.
S. H. CHAUVENET, Vice-President. RICHARD PETERS, Jr., Secretary.

WELLMAN IRON AND STEEL CO.

—MANUFACTURERS OF—

Highest Grade Open Hearth Low Phosphorus Steel Fire Box and Boiler Plate. Bessemer Steel Ship and Tank Plate. Open Hearth and Bessemer Blooms and Slabs. Low Phosphorus Pig Iron.

—PLATES UP TO 126 INCHES IN WIDTH.—

General Office and Works, Thurlow, Delaware County, Pa.

Chicago, Ills., No. 656 "The Rookery."

E. W. CRAMER, Agent.

New York, N. Y., No. 7 Nassau Street

J. H. BELCHER, Agent.

BARCLAY W. COTTON & CO.,

Successors to ESHERICK, COTTON & CO.,

Iron and Steel Merchants.

AGENTS FOR

AMERICAN WIRE GLASS MFG. CO.

418 Walnut St., PHILA.

MIFFLIN WHEELER.

G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third St., Philadelphia, Pa

—DEALERS IN—

IRON AND STEEL SCRAP.

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c., Steel and Iron Plates, New and Old Rails.

EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS.

BEAMS, CHANNELS,
ANGLES, TEES,
PLATES, BARS, RODS.

IRON AND STEEL

HOOPS, BANDS,
SPIKES, FISH-PLATES,
BOLTS, NUTS, RIVETS.

29 BROADWAY,
NEW YORK.

237 SO. THIRD ST.,
PHILADELPHIA.

70 KILBY ST.
BOSTON.

CORRESPONDENCE SOLICITED WITH BUYERS AND WITH MANUFACTURERS.

EDWARD J. ETTING,
IRON BROKER & COMMISSION MERCHANT
222 S. THIRD ST., PHILADELPHIA, PA.
Pig, Bar and Railroad Iron, Old Rails, Scrap.
AGENT FOR THE
MOUNT SAVAGE FIRE BRICK,
Eastern Penna., West New Jersey and Delaware.
Agent TRENTON IRON CO.,
For the Sale of Wire and Wire Rope.
Longdale (Va.) and other Pig Irons.
STORAGE YARD, Pier No. 57 South (old Navy Yard),
which is connected with Penn. R. R. and its various
connections. Negotiable Warehouse Receipts issued.
CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.
JEROME KEELEY & CO.,
303 WALNUT STREET, PHILADELPHIA.
Foundry & Forge Pig Irons,
Iron Ores, Coke, Coal,
Steel Blooms, Billets, Rails, etc.
Muck Bars, Blooms, Scrap Iron.
Consulting Engineers in Metallurgy and
Mining.

E. H. Wilson. A. Kaiser. J. B. M. Hiron.
E. H. WILSON & CO.,
222 and 224 South Third St., Philadelphia
BROKERS AND DEALERS IN
IRON AND STEEL.
Correspondence solicited.

J. W. Hoffman & Co.,
333 and 335 Walnut St., Philadelphia,
COMMISSION .: MERCHANTS
PIG IRON,
Iron and Steel Plates and Shapes. Rails, Cars and
Locomotives, and Railroad Equipment generally.
CORRESPONDENCE SOLICITED.

JOHN L. HOGAN & CO.,
IRON COMMISSION MERCHANTS,
Bullitt Building, 185 South Fourth St., Phila.
Agents for Brier Hill, Lehigh, Struthers
AND MUIRKIRK PIG IRON,
Delaware Rolling Mill, muck bars. Youngstown Steel
Co., Connellsville Coke.

NORTH BROTHERS MFG. CO.,
Iron and Brass Founders,
Light Castings a Specialty.
N. W. Cor. 23d and Race Streets,
PHILADELPHIA.
Correspondence solicited.

W. H. THOMSON & CO.,
Dealers in
IRON and STEEL and
other METALS
FOR ALL PURPOSES,
Room 259, Bullitt Building,
PHILADELPHIA, PA.

LUCKNOW FORGE.
JOHN W. REILY,
Fort Hunter P. O., Dauphin Co., Pa.,
MANUFACTURER OF
Blooms and Billets for Boiler Plate, Tubes,
Sheet Iron and Wire, made from
Pig Iron and Scrap.
Prices Quoted—Correspondence Solicited.

B. Houston. J. Max Bernard. H. H. Houston.
C. B. HOUSTON & CO.,
Bullitt Building. PHILADELPHIA.

Pig Iron, Coal, Coke, Steel Rails, Structural
Iron, Steel Castings and Fire Brick.
Sole Agents for PAXTON ROLLING MILLS.
STEEL AND IRON PLATES

W. S. PILLING.

T. I. CRANE.

PILLING—AND—CRANE.
IRON ORES: Lake Superior, Foreign, Concentrates,
Magnetic and native Self-fluxing.
PIG IRON: Low Phosphorus, Open-hearth, Bessemer
and other grades.
STEEL: In Blooms, Slabs and Billets, and scrap.
COKE: For Furnace and Foundry use.
BULLITT BUILDING, 141 S. FOURTH ST. PHILADELPHIA.

H. R. MANN & CO.,
Sole Agents.
ACME PIG IRON.
Guaranteed .08 % or lower in Phosphorus.

Blooms, Slabs, Plates, Sheets, Skelp, Muck-Bar and Scrap. Foreign and
American Ore. Riverside Steel Pipe. Syracuse Boiler Tubes.
47 SOUTH 4th STREET, - - PHILADELPHIA.

ALAN WOOD COMPANY,
MANUFACTURERS OF
Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,
PLATE & SHEET IRON.
ALSO LIGHT PLATES AND SHEETS OF STEEL,
No. 519 Arch Street, Philadelphia, Pa.
Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack
Tank and Boat Iron; Last, Stamping, Ferrule Locomotive Headlight and Jacket Iron.

CUMBERLAND NAIL AND IRON CO.,
MANUFACTURERS OF
"Cumberland" Nails & Wrought Iron Pipe,
43 North Water St., and 44 North Delaware Ave., PHILADELPHIA.

J. J. MOHR,
Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.
—SOLE AGENT FOR—
Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-
DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.
Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

High Grade Tested Chains.
JAMES MCKAY & CO.,
29TH & LIBERTY STREETS, PITTSBURGH, PA
Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade
Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

JAMES G. LINDSAY & CO.,
BULLITT BUILDING, 133 South Fourth St., PHILA.
IRON and STEEL STRUCTURAL MATERIAL
For all purposes. Estimates Furnished for Iron and Steel Structures.

 **DROP FORGED**
MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N. Y.

FITZSIMONS & CO.,
—MANUFACTURERS—
COLD DRAWN SHAFTING IRON STEEL
CLEVELAND, OHIO.

FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" (XX) Extra Best and "Warranted Best"
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire

SEAMAN'S "NELSON" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD.
CRUCIBLE CAST STEEL.

ABBOTT, WHEELOCK & CO., Agents and Importers of
SWEDISH IRON,

85 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand **"TOUGH"** Cast Steel for Leather Splitting and Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St. New York.

Frank S. Pilditch, Agent.

GUSTAF LUNDBERG

Agent for **N. M. HOGGLUND'S SONS & CO. of Stockholm.**

Swedish and Norway Iron.

Bessemer and Open Hearth Steel.

19 KILBY STREET, BOSTON.

CARLISLE WORKS, KAYSER, ELLISON & CO., SHEFFIELD, ENGLAND

Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

81 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Corset Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

JESSOP'S STEEL

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

OF Best Quality,
IN Bars, Sheets and Plates.

Large assortment of sizes in stock at

91 John St.

And other Agencies.

NEW YORK

SHEFFIELD, ENGLAND.

Gold Medal Paris, 1889.

WIRE

DRAWING

WORTLES, PLATES and JEWEL DIES.

DIES

NEWTON & SHIPMAN,

83 John St., - New York.

CAMBRIA STEEL,

Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings,
 BESSEMER AND OPEN-HEARTH BLOOMS, BILLETS AND BARS.
 Steel Axles, Steel Angles, Steel Channels, Steel Forgings
CAMBRIA IRON COMPANY, Office, 218 S. Fourth St., Philadelphia.
 Chicago Office, Phoenix Building.
 (WORKS AT JOHNSTOWN, PA.)

A. & P. ROBERTS & COMPANY,
Pencoyd Iron Works, **Pencoyd Bridge & Construction Co.,**
 MANUFACTURERS OF DESIGNERS AND MANUFACTURERS OF
Wrought Iron and Open Hearth Steel, Bridges, Viaducts, Turn Tables, Etc.
 OFFICE: 261 S. 4th Street, PHILADELPHIA, Pa. WORKS, PENCYD, PA.

EICKEN & CO.'S CRUCIBLE TOOL STEEL

HAGEN, WESTPHALIA, GERMANY.

SPECIAL No. 8 works and Fine-Finishes the HARDEST Rolls and Material. BOSS Cold Chisel; HIGH-GRADE ADAPTED Twist Drill, Tap, Punch, Die, Reamer, Wood and Milling-Cutter-Steel and Blanks.

HIGHEST QUALITY, LOW PRICES, INDUCEMENTS to the TRADE and large USERS.

REPRESENTED BY EDW'D VORSTER. } IMPORTERS AND EXPORTERS. { MARKT & CO., Agts.,
 79-85 North Moore St., New York.
 Stock for immediate wants and Trial Orders. Exclusive Local Agencies granted.

THE IRON-FOUNDER:

A COMPREHENSIVE TREATISE ON
 THE ART OF MOLDING,

INCLUDING CHAPTERS ON

CORE-MAKING; LOAM, DRY-SAND, AND GREEN
 SAND MOLDING; ALSO CRYSTALLIZATION,
 SHRINKAGE, AND CONTRACTION OF CAST
 IRON, AND A FULL EXPLANATION OF
 THE SCIENCE OF PRESSURES IN
 MOLDS; ADDED TO WHICH ARE
 FORMULAS FOR MIXTURES OF
 IRON, TABLES, RULES AND
 MISCELLANEOUS INFOR-
 MATION.

BY

SIMPSON BOLLAND,

Practical Molder and Manager of Foundries

Illustrated with over Three Hundred
 Engravings.

12mo, Cloth, \$2.50.

Will be sent free on receipt of the price.

"Among the many recent additions to technical literature, we know of none of more practical value than THE IRON FOUNDER. There are thousands of men in our foundries who will be greatly benefited by its 382 pages of interesting and valuable information."—The Age of Steel.

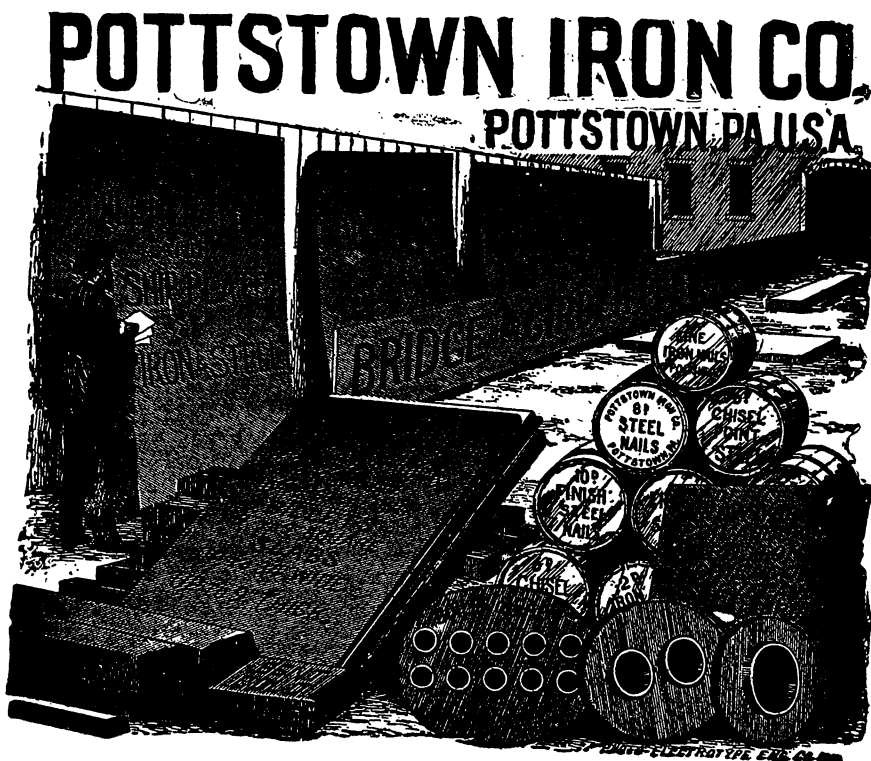
SENT, POSTPAID, ON RECEIPT OF PRICE, BY

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade St., New York

A. MILNE & CO..
Swedish (Norway) Iron and Steel,
 BLOOMS, BILLETS, BARS; WIRE, RIVET AND NAIL RODS.
FOREIGN AND DOMESTIC IRON AND STEEL.
 1 Broadway, New York. 8 Oliver Street, Boston.



FRANKFORD STEEL COMPANY
 FRANKFORD, PHILA., PA.
Steel Railroad and Machine Forgings,
 SOLID CRUCIBLE STEEL CASTINGS
 AND
 Best Grades of Tool and Machinery Steel.

ÆTNA-STANDARD IRON AND STEEL CO.,Successors to **Ætna Iron and Steel Co., and The Standard Iron Co.,** Manufacturers of**PLATES and SHEETS, BLACK, GALVANIZED and CORRUGATED** Plain Roofing, Siding and Ceiling, also of Sheet Steel, for special purposes, Cold Rolled or Plain and Patent Leveled.**BARS, LIGHT SECTION RAILS, ANGLES, TEES and CHANNELS,** odd sections and sizes, Machine Straightened Steel Tire, Ordinary Shafting, Horse-Shoe Bars, Ax-Poll Steel, Toe Calk, Nut, Bolt and Chain Rods, and other special Bars suited to every requirement.**PROMPT SHIPMENT from STOCK.**Inquiries solicited. Stock List Mailed on Application. Address, **BRIDGEPORT, OHIO.****E. S. PICKANDS, } CHICAGO.
W. L. BROWN, }****PICKANDS, BROWN & CO.,****PICKANDS, MATHER & Co.,
CLEVELAND.**

Sole Agents Pig Iron Department Illinois Steel Company and Manufacturers and Dealers in

PIG IRON and IRON ORB,

1007, 1009 and 1011 Rookery Building, Chicago.

CARBON STEEL COMPANY,**PITTSBURGH, PA.,**

—MANUFACTURERS OF—

**Universal Mill Plates. Sheared Plates and Sheets. Boiler, Ship and Armor Plates. Also Nickel Steel Plates. List of Sizes Sent upon Application.****AGENCIES:****L. S. BOOMER, 647 The Rookery, Chicago, Ill.****THE CONDUIT-FULLER CO., Perry-Payne Building, Cleveland, O.****GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.****JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.****BULLARD & POST, 125 Milk St., Boston, Mass.****THE S. Obermayer Co.,****FOUNDRY FACINGS,****PLUMBAGO and****Manufacturers of****FOUNDRY SUPPLIES,****Importers of****INDIA SILVER LEAD****FOUNDRY EQUIPMENTS.****FOR ALL PURPOSES.****Selling Agents for****BLAKENEY CUPOLA.****CINCINNATI, OHIO.****Send for Catalogue.****Foundry
Facings****Foundry
Supplies****MANUFACTURERS,****J. W. PAXSON & CO.****Philadelphia, Pa.****GROUND SILICA ROCK,
FIRE BRICK,
FOUNDRY LADLES,
TUMBLING BARRELS.****CORE-COMPOUND.****GEORGE MESTA, Prest.****W. D. ROWAN, Sec.****J. O. HORNING, Treas.****LEECHBURG FOUNDRY & MACHINE CO.,****Office: LEWIS BLOCK, Pittsburgh, Pa.****Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes****ROLLS. MESTA'S PATENT PICKLING MACHINES AND TIN
PLATE-MACHINERY.****ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.****—AMERICAN—****PIG IRON Storage Warrant Co.****(Bank of America Building.)****44 Wall Street, - NEW YORK.****Correspondence of Furnaces Invited.****PIERSON & CO.,****—DEALERS IN—****IRON and STEEL****OF EVERY DESCRIPTION,****29 Broadway, cor. Morris St.,
NEW YORK.****Tips to Inventors. By ROBERT GRIMSHAW, Ph.D.,
M.E. Telling what inventions are needed and how
to perfect and develop new ideas in any line.
Cloth.....\$1.00
For Sale by David Williams, 96-102 Reade St., N.Y.**

IRON AND STEEL

BARS, ANGLES, CHANNELS, BEAMS AND STRUCTURAL SHAPES.

Bridge, Boiler, Tank and Ship Plates.

FOUNDRY and FORGE

Pig Iron, Steel Slabs, Billets and Ingots

CHARLES K. BARNES & CO..

224 South Fourth St., PHILADELPHIA

L. & R. WISTER & CO.,

IRON COMMISSION MERCHANTS,

257 So. 4th St., Philadelphia.

Agents for the following Foundry and Forge Pig Irons: Dunbar, Kemble, Fawcett was (Black Band), Wyebrooke & Co. (Charcoal Pig Iron), Warner & Co.'s (Middlesboro, England), Carbonizing and Malleable Irons.

Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,
Manufacturers' Agents

For Iron and Steel Rails, Car Wheels, Boiler and Sheet Iron and General Railway Equipments.
Old Rails, Axles and Wheels bought and sold
284 S. 4th St., Philadelphia.

Established 1847.

A. WHITNEY & SONS,
CAR WHEEL WORKS,
PHILADELPHIA.

Special Wheels for Furnace and Mine Cars.

Manhattan Rolling Mill.

JOHN LEONARD,
446 to 452 West St., New York.

MANUFACTURER OF

HORSE SHOE AND BAR IRON
BLACKSMITH SUPPLIES.
Brooklyn Branch, 589 Kent Ave.

OGDEN & WALLACE,
85, 87, 89 & 91 Elm St., New York.
IRON AND STEEL

Of every description kept in stock.
Agents for Park, Brother & Co.'s
BLACK DIAMOND STEEL.

All sizes of Cast and Machinery Steel constantly on hand.

WILLIAM H. WALLACE & CO.,
IRON AND STEEL,
10, 12 and 14 ALBANY ST.,
and 131 WASHINGTON ST.,
NEW YORK.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

THE MAHONING VALLEY IRON CO.

—MANUFACTURERS OF—

Bar, Band, Sheet, Plate and Tank Iron,
Angle Iron, Nails, Boat Spikes and Rivets

YOUNGSTOWN, OHIO.

THE BETHLEHEM IRON COMPANY.

SOUTH BETHLEHEM, PENNA.

STEEL RAILS,
BILLETS AND MUCK BAR,
STEEL FORGINGS.

HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.
Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.

NEW YORK OFFICE, - - - 80 BROADWAY.
PHILADELPHIA OFFICE, - - - 421 CHESTNUT ST.

PASSAIC ROLLING MILL CO., Paterson, N. J.

—MANUFACTURE—
ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Forgings, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.

JUSTICE COX, Jr., IRON AND STEEL

No. 218 SOUTH 4th ST., PHILA'D, PA.

Agent Haldeman, Grubb & Co.'s Chickles Bessemer Pig Iron,
for Mahoning Rolling Mill Co.'s Best Quality Skelp Iron and Steel,
Pulaski Iron Co.'s High Grade Foundry and Forge Pig Iron.

Bars, Angles, Sheets, Tank and Bridge Plates, Muck Bars, Blooms, Scrap Iron and Tool Steel.

THE MONTGOMERY IRON & STEEL COMPANY,

DANVILLE, PA.



PIG IRON, T AND STREET RAILS,

Light Rails, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

NAYLOR & CO.,

New York: 45 Wall Street.

PITTSBURGH, PA.: Lewis Block. PHILADELPHIA, PA.: Bullitt Bldg

IRON ORE, PIG IRON,
SPIEGEL AND FERRO,
IRON AND STEEL WIRE RODS, STEEL BLOOMS, BILLETS AND
SLABS, METALS AND OLD MATERIALS.

- R. MUSHET'S - "SPECIAL," STEEL "TITANIC,"

FOR LATHES AND PLANER TOOLS.

For Chisels, Taps, Dies, Chilled Roll Turning, Punches, &c., &c.

(The "Trade-Marks" of which are registered in the United States.)

MANUFACTURED ONLY BY

SAMUEL OSBORN & CO., Clyde Steel & Iron Works, Sheffield, Eng.

SOLE REPRESENTATIVES IN THE UNITED STATES,

B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.

No. 143 LIBERTY STREET, NEW YORK.

BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and bookseller, 96-102 Reade St. New York

ESTABLISHED IN 1848. **SINGER, NIMICK & CO., Ltd.** PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

Hammered and Rolled STEEL. Warranted Equal to any Produced.**HIGH GRADE SPECIAL Crucible Tool Cast Steel**, for all purposes requiring the **very finest** quality.**SINGER'S ANNEALED EXTRA Crucible Tool Cast Steel**, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an **extra fine** quality.**BEST Crucible Tool Cast Steel**, for all purposes requiring steel of **Standard** quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.**SAW STEEL**, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.**HOT ROLLED SHEET STEEL**, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.**BRIGHT COLD ROLLED SHEET and STRIP STEEL**, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequalled finish and accuracy of gauge.**ROUND MACHINERY STEEL**, for Shafting, Rollers, Spindles, &c., &c.**AGRICULTURAL STEEL.**

"Iron Centre" Cast Plow Steel.
 "Soft Steel Centre" Cast Plow Steel.
 "Soft Steel Back" Cast Plow Steel.
 "Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.
 Crucible Cast Plow Steel.
 Steel Rotary Harrow Discs.
 Finished Rolling Plow Cutters.
 Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at **243 Pearl and 18 Cliff Streets, NEW YORK**, by**HOGAN & SON, General Agents for Eastern and New England States.**

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston, and

W. E. STOCKTON, 16 & 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

LA BELLE STEEL CO.,

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa

MANUFACTURERS OF ALL KINDS OF STEEL SPRINGS, AXLES, RAKE TEETH, Etc.**WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston, and 93 Liberty St. N.Y.**

RICE, LEWIS & SON, Toronto, Ont.

J. TATNALL LEA & CO.,

No. 125 So. Fourth St., Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIG IRON,
MUCK BARS AND IRON ORES.**

— SOHO IRON & STEEL WORKS —

MOORHEAD & McCLEANE CO.
 MANUFACTURERS OF
PLATE IRON & STEEL
GALVANIZED SHEET IRON
PLATES SPECIAL WIDE
SHEETS AND EXTRA LONG
SKELP IRONS
CORRUGATED & ROOFING IRONS

SOHO CHB TRADE MARK

OFFICES AND WORKS.
PITTSBURGH.

EASTERN WAREHOUSE.
 No. 81 JOHN STREET,
 NEW YORK.

WESTERN WAREHOUSE.
 Nos. 16 & 18 W. LAKE ST.
 CHICAGO.

W. Dewees Wood Co.,

MANUFACTURERS OF PATENT

PLANISHED SHEET IRON.**PATENTS:**

| | | |
|------------------|-------------------|------------------|
| Feb. 6th, 1877. | Feb. 12th, 1884. | Jan. 6th, 1885. |
| Dec. 10th, 1878. | Mar. 4th, 1884. | Aug. 31st, 1886. |
| Jan. 10th, 1882. | April 15th, 1884. | Jan. 1st, 1889. |
| Jan. 1st, 1884. | June 10th, 1884. | Jan. 17th, 1893. |

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS:

McKEESPORT PA.

Branch Office: 111 Water Street, Pittsburgh, Pa.

J. WESLEY PULLMAN

No. 238 S. Third St., Philadelphia.

BEST IRON ORESNew Jersey. New York. Lake Superior.
WARWICK PIG IRON.

Stay-Bolt,
 Rivet, D. Link,
 Axe, Hatchet,
 Carriage and
 Wagon Axle.

IRON.**Superior Quality Refined Bar Iron,**
 "VULCAN" AND "LOCKHART" BRANDS.

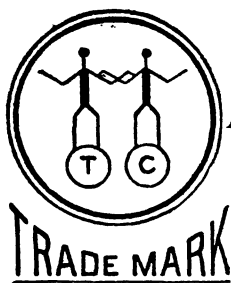
SMALL CHANNELS AND ANGLES,
HEXAGON IRON AND STEEL.

All
 Merchant Bar
 Sizes
 of
 Soft
STEEL.

THE MANNESMANN TUBE CO., LTD.,

LANDORE, South Wales, England,

Manufacturers of the



Mannesmann Patent Weldless Steel Tubes.

Rolled Direct from the Solid Bar. The only Tubes with a Spiral Fibre.

SPECIALTIES: Cold Drawn Steel Cycle and Boiler Tubes made of the finest Swedish Charcoal Steel produced. Far superior to any others in the market. Best Quality Boiler Tubes (ordinary Finish). Hydraulic, Well Boring and Shell Tubes.

SAMPLES FREE.

FOR PARTICULARS AND PRICES, APPLY DIRECT OR TO OUR AGENT,

D. B. McILWAINE, 111 Chambers St., - - - NEW YORK.

MAHONING FOUNDRY & MACHINE SHOP,

BUILDERS OF

Blast Furnaces, Rolling Mill and Mining Machinery,

ROTARY SQUEEZERS, ORE CRUSHERS, ROLL TRAINS, SHEARS, IRON TRUCKS, &c.

Makers of Castings of all descriptions for cable and electric railroads, building fronts, columns, etc. Address

FRANK JAMESON, Manager, Danville, Pa.



Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.

CHROME STEEL WORKS,
Brooklyn, N. Y.

DROP-FORGINGS

—AND—
DIES TO ORDER.

First Class Work.

THE HERBRAND CO., - FREMONT, O.

A. R. WHITNEY & CO.,

MANUFACTURERS AND DEALERS IN

IRON and STEEL.

AGENCIES:

CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.

PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.

BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.

RIVERSIDE IRON WORKS, Steel Pipe.

GLASGOW TUBE WORKS, Boiler Flues.

AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States, 25 in Europe and 100 in Canada.

THE SEIDELL & HASTINGS CO., Charcoal-Iron Boiler Plates.

Plans and estimates furnished and contracts made for Iron and Steel Structures of every description. Please address,

29 Broadway, New York.

P. O. Box 33.

TAYLOR

IRON AND STEEL COMPANY.

STEEL FOUNDERS

Licenses in the United States for making Hadfield's Manganese Steel.

STEEL CASTINGS OF EVERY DESCRIPTION.

Specialties: Steel Tired and Solid Steel Wheels; Chilled Iron Wheels; Iron and Steel Axles, etc., etc.

General Office and Works, **High Bridge, New Jersey.**

STEEL PIPE AND NAILS.



SAMPLE OF STANDARD RIVERSIDE STEEL PIPE HAMMERED COLD. (From Photograph.)



SAMPLE OF STANDARD IRON PIPE HAMMERED COLD. (From Photograph.)

PIG IRON, STEEL BLOOMS, STEEL BILLETS, SMALL STEEL T RAILS.

Riverside Iron Works, Wheeling, West Va.

New York Office, 21 BEEKMAN ST.

CHARLES S. STEPHENS. Eastern Representative.

CHESS BROTHERS,

MANUFACTURERS OF A FULL LINE OF

SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.

Always in stock. Special goods made to order.

SOFT STEEL PLATES.

Suitable for Implement manufacture and for all Blanking or Stamping uses, of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive, in widths up to 15½ inches and to multiples of lengths desired. Finished black or scaled. And

EXPANDED METAL

In all its varieties of Fire-Proof Lath Fencing, Tree Guards, &c. Send for catalogues and prices.

Office, 531 Wood St., PITTSBURGH, PA.

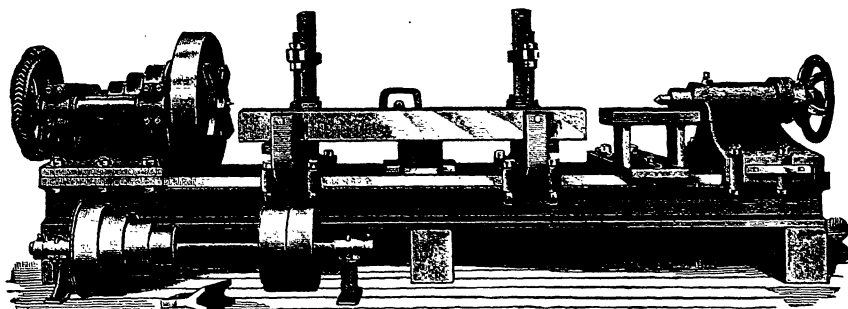
DROP FORGING

J.C. SPEIRS & CO. WORCESTER. MASS.

J.S. SEAMAN.
ROBT. SLEETH
GEO. P. BLACK


PHOENIX ROLL WORKS
SEAMAN, SLEETH & BLACK
OFFICE & WORKS
418 & 420 ST. & AV. R.R.
ESTABLISHED 1870

ROLLS AND PINIONS
MANUFACTURE AND FINISH
EXCLUSIVELY.
FOR ALL PURPOSES.

NEW IMPROVED STANDARD ROLL LATHE.

Made by **TOTTEN & HOGG I and S FOUNDRY CO.,** Pittsburg, Pa., Manufacturers of
CHILL ROLLS AND ROLLING MILL MACHINERY.

THE CAMBRIDGE IRON & STEEL CO.
MANUFACTURERS OF

GALVANIZED  **SHEET IRON**

BLACK SHEETS FOR ROOFING & CORRUGATING

PICKLED & COLD ROLLED FOR STAMPING

CORRESPONDENCE SOLICITED

CAPACITY RANGES FROM NO. 30
26 INCHES WIDE TO 14' 40-120

OFFICE & WORKS **CAMBRIDGE, OHIO.**

—ESTABLISHED 1850.—

ARCADE MALLEABLE IRON CO.

WARREN MCFARLAND & CO.

Malleable Iron and Steel Castings,

WORCESTER, MASS.

Correspondence solicited.

Prices given upon receipt of patterns or samples

GEO. B. BUCKINGHAM.

John H. Ricketson, Prest. Wm. Holmes, Treas.
A. G. Barnett, Sec'y.**A. GARRISON FOUNDRY CO.,**

Manufacturers of Sand, Patent Homogeneous, Steel and

Chilled Rolls

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings of every description.

Office, Nos. 10 & 12 WOOD ST., PITTSBURGH, PA.

BIRMINGHAM IRON FOUNDRY,

BIRMINGHAM, CONN.

CHILLED ROLLS AND ROLLING MILL MACHINERY,

McCoy Patent Mill Pinions,

Shears, Rotary Squeezers.

WIRE DRAWING MACHINERY

Special Rolling Machines for Gun Barrels, Hoes, Pick and Axe Polls, Odd Shapes and Tapers.

ESTABLISHED

1836.

POWDER

—FOR—

Blasting, Mining and Sporting.
ORANGE BRAND.**ELECTRIC BLASTING APPARATUS****SAFETY FUSE, &c.**

Send postal card for Illustrated Pamphlet, showing sizes grains Powder, and describing Blasting Apparatus. Mailed **FREE.**

LAFLIN & RAND POWDER CO.,

New York Office, 29 Murray St.

DYNAMITE,**RED STAR BRAND****For Mining, Quarrying and Stump Blasting.**

Safety Fuse, Caps, Platinum Fuse, Leading and Connecting Wire, with every other requisite for Blasting Purposes. The especial attention of the hardware trade is invited to our line of goods.

NEW YORK POWDER CO.,

62 Liberty St., New York.

VULCAN IRON WORKS
CHICAGO

PILE DRIVERS

**S. CHENEY & SON,
GRAY IRON CASTINGS,****CHEAP HEATING STOVES,****DIAMOND THIMBLES,**

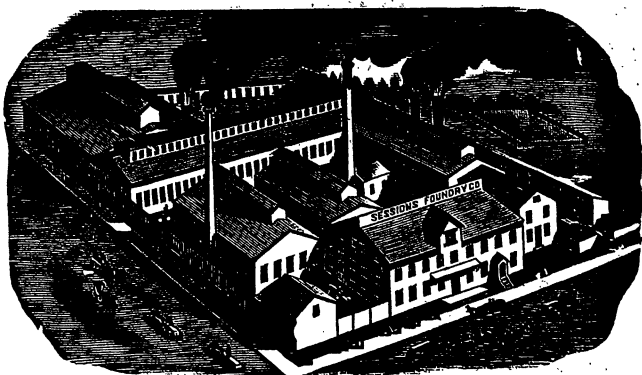
MANLIUS, N. Y.

IRON CASTINGS TO ORDER.

Small and Large Grey (or common) Iron Castings of uncommonly fine quality. Four large Cupolas run daily. Castings soft, smooth and strong. Prices very Low.

We make Castings for all purposes, such as Builders' and Domestic Hardware, Electrical work, Piano and Organ, Wringer, Furniture, Lamp and Chandelier and Agricultural Implement Castings, Grates, Furnaces and Machinery Castings, &c., &c. If you buy any, write us, stating quantities. Send samples if possible.

SESSIONS FOUNDRY CO., Bristol, Conn.



MCLEOD & HENRY Co
FIRE BRICK
TROY, N.Y.

LIGHT SOFT GREY IRON CASTINGS AND INTRICATE CORE WORK SPECIALTIES.

Estimates cheerfully given on all kinds of Castings.

PEERLESS FOUNDRY CO.,

Washington Ave., above 20th St.,
 ROBERT PRESTON, Manager. PHILADELPHIA

ESTABLISHED 1856

HENRY MAURER & SON,
 MANUFACTURERS OF
FIRE BRICK
 of all Shapes and Sizes,
 420 E. 23d St. New York.

B. KREISCHER & SONS,
FIRE BRICK

BEST AND CHEAPEST,

ESTABLISHED 1845,

Office, foot of Houston Street, East River, NEW YORK

ESTABLISHED 1864.

JAMES GARDNER & SON
 MANUFACTURERS OF
 "STANDARD SAVAGE" FIRE BRICK
 TILE and FURNACE BLOCKS

OF ALL SHAPES AND SIZES.

WORKS, Eilerslie, Allegheny Co., Md.
 OFFICE, Cumberland, Md.; P. O. Box 540.

S. M. Hamilton & Co., Agents, - Baltimore, Md.
 Stowe, Fuller & Co., Agents, - Cleveland, O.

Established 1848.

OSTRANDER FIRE BRICK CO.,
 Manufacturers of

FIRE BRICK
 FOR ALL PURPOSES,
 TROY, N. Y.

UNION MINING COMPANY
MOUNT SAVAGE FIRE BRICK.
 Agent for Eastern Penna., West New Jersey and Delaware
EDWARD J. ETTING,
 Third St., Philadelphia, Pa.

PALMERS & DE MOOY FOUNDRY CO.
IRON FOUNDRY
 LIGHT GRAY CASTINGS A SPECIALTY
 EDWARD TER STE.

Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. CLEVELAND, O.
 Metal Patterns designed and made. Also Japanning and Galvanizing.

STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,
 Of Open Hearth, Chester or Bessemer Steel.
True to Pattern. Sound. Solid.
 Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.
 Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.
 Steel Castings of Every Description.
Chester Steel Castings Co.
 Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

THE ROBINSON-REA MFG. CO.,
PITTSBURGH, PA.

SAND & CHILLED ROLLS.
TIN PLATE PLANTS COMPLETE.
 (No. 5.)

Have You Used

IF NOT YOU OUGHT TO.

Because it's not only best, but cheapest in the end.
 Requires no experimenting. Anyone can successfully use it from the start. Samples free.

THE J. D. SMITH FOUNDRY SUPPLY CO.,
 CINCINNATI, O.



Frank C. Roberts & Co.,
 CIVIL ENGINEERS.

Blast Furnaces, Steel Works, Rolling Mills, Iron and Steel Bridges and Buildings, Factory and Warehouse Construction
 OFFICES:

s E. Cor. 4th and Chestnut Sts., Philadelphia, Pa.

HENRY AIKEN,
 Consulting Mechanical Engineer,
 Rooms 203-206 Lewis Block,
 PITTSBURGH PA.

KEY TO STEAM ENGINEERING.

Embracing important questions answered concerning the steam engine and boiler.

By H. S. WILLIAMS.

174 Pages, 18mo, Cloth, 50 Cents.

Sent post-paid on receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade St., New York.

WYMAN & GORDON, Worcester, Mass.

DROP



FORGINGS.

GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS
of the very best quality.Very much time saved by using clean and soft castings. We use only the best material. A trial will convince you. **PICKETS and ROSETTES** for Wire Workers. Catalogue of same. **NICKEL PLATING and JAPANING**, also **METAL PATTERN MAKING**. We invite correspondence.**HAIGHT & CLARK, - - ALBANY, N. Y.**

DROP FORGINGS

Of Every Description, in Iron, Steel, Copper and Aluminum.

Hoist Hooks, Shafting Collars, Eye Bolts, Wrenches, Machine Handles, Fence Ornaments.

SPECIAL ATTENTION GIVEN TO THE MANUFACTURE OF SPECIAL FORGINGS.**PHILADELPHIA DROP FORGE COMPANY,**

Office and Works, S. E. Cor. American and York Sts., Philadelphia.

THE JOHNSON FOUNDRY CO..

JOHNSTOWN, PA.

CHILLED AND SAND ROLLS.
GENERAL CASTINGS.**STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO**

—HEADQUARTERS FOR—

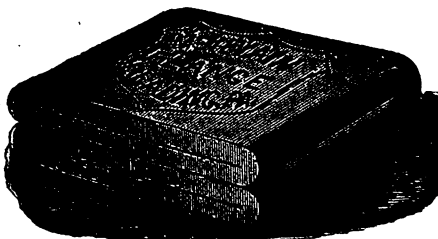
LIGHT GRAY IRON CASTINGS.

—UNEQUALED IN—

SOFTNESS and SUPERIOR FINISH.

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can please you. Send samples for prices.

TENSILE STRAIN. } 56,000 to 64,000 lbs.

CAPACITY. { Plates 1 inch thick to No. 12.
30 feet long.
70 inches wide.**WM. McILVAIN & SONS,**

READING, PA.,

MANUFACTURERS OF

**IRON AND STEEL
BOILER PLATES.**

Locomotive, Fire Box, Flange, Shell Tank Iron and Steel, including Plates for Bridges, Girders, Stacks, Pipe and Fire and Burglar-proof Safes.

DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.

Sole Manufacturers of Ahlstrom's Patent Parallel Double

EXPANSION BOLTS,

also Single Expansion Bolts. Catalogues mailed on Application.

W. C. BOONE MFG. CO. - Office and Factory, - BOONTON, N. J.**The Trenton Malleable Iron Company.****MALLEABLE CASTINGS**

Made from Refined Air Furnace Iron.

SPECIALTIES: Malleable Iron Castings, Car Couplers, R. R. Supplies, Street Car R. R. Supplies, Car Replacers, Malleable Iron Castings for Contract Work, Frog and Switch Castings, Castings—Light and Heavy, Journal Box Castings, Car Trimmings.

Prices given upon receipt of Patterns or Sample Castings.

Trenton - - - - - New Jersey.**R. D. Wood & Co.** 400 Chestnut St. PHILADELPHIA.

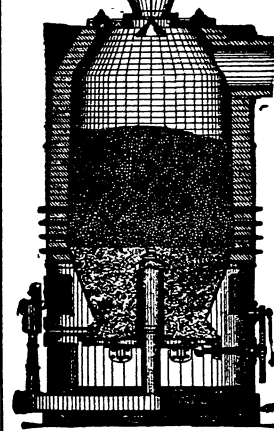
SOLE MAKERS OF THE

TAYLOR REVOLVING-BOTTOM GAS PRODUCER.

Patented in the United States and all Foreign Countries.

The best Producer for either Bituminous or Anthracite coal or Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for brick Linn, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.

Also applicable to all Regenerative Furnaces. Send for Pamphlet.

**CAST IRON PIPE****MATHEWS' FIRE HYDRANTS EDDY VALVES, VALVE INDICATOR POSTS.**

Heavy Loam Castings Special Machinery.

Water Power Pumps and TURBINES.

HYDRAULIC JIB and TRAVELING CRANES,**FREIGHT and CAR LIFTS, Etc.****GAS HOLDERS and GAS MACHINERY.****WEST COXSACKIE IRON FOUNDRY.**Soft, **CASTINGS** Grey, Light Medium

We solicit correspondence. Prices on application.

COXSACKIE, N. Y.**A Trial will Convince You**

—THAT WE MAKE—

**SOFT AND SMOOTH
Light Gray Iron Castings,**

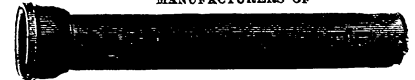
- - SOUND - -

Brass and Bronze Castings**TRUE TO THE PATTERN.**

Also HAVE FACILITIES FOR FINISHING. Sample for estimate solicited.

I. S. SPENCER'S SONS, Guilford, Conn.**DONALDSON IRON COMPANY,**

MANUFACTURERS OF

**CAST IRON PIPE**
And Special Castings for Water and Gas. Also Flange Pipe **Emaus, Lehigh Co., Pa.****FRANCIS WISTER, COMMISSION MERCHANT, COKE, COAL, ORES.**

National Foundry Coke a Specialty. Sulphur less than 0.5.

All sizes National Crushed Coke. Bullitt Building, PHILADELPHIA.

FINE CRAY IRON**FRANKLIN IRON FOUNDRY,****The Burr and Houston Company**

33-39 Franklin Street, Brooklyn (Greenpoint), N. Y.

Special Attention Given to Fine Castings.

Telephone Call Greenpoint 174.

Hosted by Google

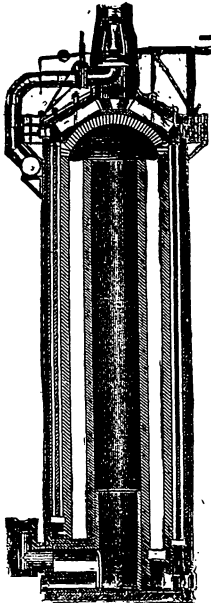
Circle Cutting Machines.

TRETHEWEY MFG. CO., - 47th ST., PITTSBURGH, PA.

MANUFACTURERS OF.

Roll Lathes, Hardened Forged Steel Rolls, Roll Turning Tools, Solid Steel Shear Knives, Tool Steel Dies of any size. Forgings of Machinery or Tool Steel, Rolling Mill Machinery, Steam Hammers, Squaring Shears, Double Headed Rotary Shears. Shear Grinding Machinery

McCLURE, AMSLER & CO.
*Engineers and
Contractors*

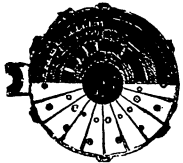


Bissell Block,
PITTSBURGH, PA.
Blast Furnace
Construction
A SPECIALTY.

Sole Agents for
MASSICK'S & CROOKE'S
PATENT

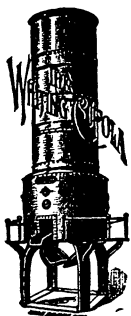
Fire Brick
Stoves,

Designs and Estimates
for the construction of
Blast Furnace Work,
and for all kinds of Hot
Blast Fire Brick or Pipe
Stoves; and all other kinds
of Brick Work pertaining
to Steel Plants, Iron, Brick
or Wooden Buildings, all
kinds of Iron Construction
in general.



*We propose to put into successful
operation all the plants we design and
contract for.*

MELTERS



OF IRON—who
make a business of
melting it cheaply
—invariably prefer

"The
Whiting."

Read our circular and post
yourself on the best cupola.
Twelve sizes.

**Detroit Foundry Equipment
Co.,**

CRANES, LADLES, TRUCKS, TUMBLERS,
ELEVATORS.

Whiting's Improved Car Wheel Foundry Plant.

DETROIT: CHICAGO:

Mich. Ave. & D. & B. C. Ry. 225 Dearborn St.

THE S. R. SMYTHE COMPANY, INCORPORATED.

LEWIS BLOCK, ENGINEERS AND CONTRACTORS. PITTSBURGH, PA.

**Regenerative Gas Furnaces and Gas Producers
For All Purposes.**

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc.,

We contract for complete Plants, guarantee results and satisfactory operation
of same.

OVER 100 PLANTS IN SUCCESSFUL OPERATION.

JULIAN KENNEDY.
Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills.

STEAM AND HYDRAULIC MACHINERY, &c.

—Branch Office of The Latrobe Steel Works.—

Wm. Swindell & Bros.,
ENGINEERS AND CONTRACTORS,

Regenerative and Recuperative Gas Furnaces for
Steel, Iron and Glass.

SWINDELL'S IMPROVED GAS PRODUCERS,

243 BUILT SINCE APRIL 1, 1891.

P. O. Box 945.

548 Smithfield St., Pittsburgh, Pa.

ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

GAS HEATING
GAS PUDDLING
CRUCIBLE
OPEN HEARTH
TUBE WELDING

FURNACES

AND ARTIFICIAL GAS PRODUCERS OF EVERY
DESCRIPTION, FOR ROLLING MILLS, STEEL AND TUBE WORKS.
We guarantee to place all plants erected by us in successful operation.

J. A. HERRICK, M. E.,

Consulting Engineer and Contractor.

Room 609, 284 Pearl Street, NEW YORK.

—STEEL CASTING PLANTS A SPECIALTY.—

Melting and Heating Furnaces of ALL KINDS.

Patent Gas WATER VALVES. Improved "BASIC" and "SEMI-
STEEL" Processes and FURNACES.

New CONTINUOUS Gas PRODUCERS.

JAMES P. WITHEROW CO.,

SHOPS: New Castle, Pa.

GENERAL OFFICES: Times Building, Pittsburgh, Pa.

ENGINEERS, CONTRACTORS, &c.

JAMES P. WITHEROW General Manager.

JAMES HEMPHILL, President.
WM. H. CONLEY, Treasurer.

THOS. B. RITER, Vice-President.
JNO. F. WILCOX, Gen'l Manager.

PITTSBURG IRON & STEEL ENGINEERING CO.

LEWIS BLOCK, PITTSBURG, PA., U. S. A.

BESSEMER AND OPEN-HEARTH STEEL PLANTS.

Rolling Mills (Blooming, Rail, Plate, &c). Blast Furnaces, Engines
Boilers, Bridges, Girders, Iron Buildings.

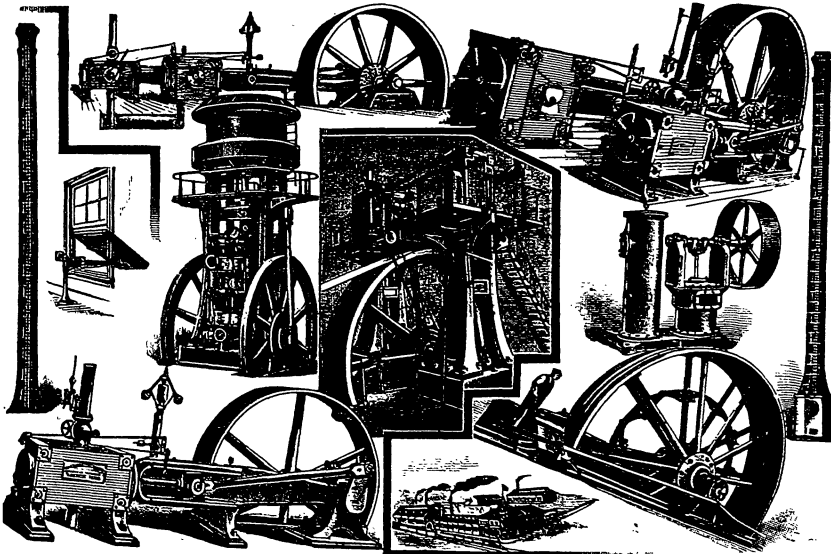
WORKS BUILT COMPLETE and Fully Equipped for Operation.

THE D. R. LEAN COMPANY, ENGINEERS and CONTRACTORS,

Penn Building, Pittsburgh, Pa.

Blast Furnace and Steel Plant construction. Regenerative
Gas Furnaces and Gas Producers.
Sole Agents **FORD & MONCUR'S** Fire Brick Stove, Machinery
and Castings. Iron Buildings. &c.

— PHILADELPHIA CORLISS ENGINES. —
AIR PUMPS AND CONDENSERS.
BAND AND FLY WHEELS. STEEL-PLATE CHIMNEYS.
— BLOWING ENGINES. —



BUILT BY
PHILADELPHIA ENGINEERING WORKS, LIMITED,
MIFFLIN STREET, EAST OF FRONT,
PHILADELPHIA, PA.

THE COST OF MANUFACTURES —) AND THE (— ADMINISTRATION OF WORKSHOPS, Public and Private.

BY CAPT. HENRY METCALFE.

322 Pages; 6¼ x 9½ inches.

CLOTH, \$5.00

This work is an effort to correct some of the wrong, and consequently unprofitable, methods of conducting manufacturing establishments, and proposes plans for more correct ones. A system of mechanical bookkeeping, based on the card catalogue method, dispensing with the use of books, by which the cost of manufactures may be promptly determined, either in gross or detail, as to component parts and operations thereon. Comprising a simple method of recording all dealings with material which relate to its procurement, expenditure or possession. Applied, with numerous practical illustrations, to the trust, accountability for public property and funds required of the U. S. Ordnance Department, with a review of its present practice. Illustrated with tables, forms of cards, etc.

Any Book Published Sent, Post-paid, on Receipt of the Price, by

DAVID WILLIAMS, Publisher and Bookseller
96-102 Reade Street, New York.

VICTOR COLLIAU,
Sole builder of his
New and Improved Patented
HOT-BLAST
Colliau Cupola,
287 Jefferson Ave.,
DETROIT, MICHIGAN,
U. S. A.



The Iron-Masters' LABORATORY

Exclusively for the
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

Branch Office, 339 Walnut St., Philadelphia.

All Analytical Work at Warrenton, Virginia.
J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

M. V. SMITH, PRES.
C. MORROW, SEC.

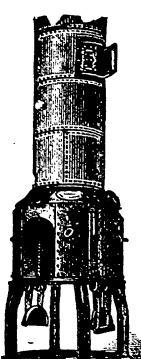
M. A. GREENE, VICE-PRES.
JOHN A. ELLIOTT, TREAS.

Artificial Gas Engineering Co., Consulting and Contracting ENGINEERS.

ARTIFICIAL GAS applied to all Branches
of Manufacturing and Domestic Uses.
Apparatus for the Manufacture of
Coal-Gas Furnished at Lowest Prices.

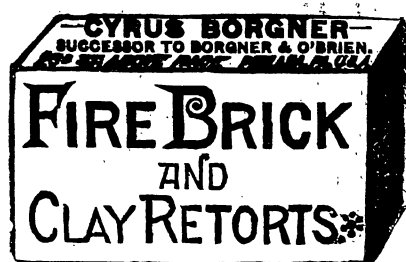
706 TIMES BUILDING,
PITTSBURGH, PA.

THE COLLIAU PATENT
Cupola Furnace
Melting capacity of output
for the year 1892,
824,442
NET TONS.
Correspondence Solicited.
BYRAM & COMPANY,
Exclusive Manufacturers,
DETROIT, . . . MICH



EXHAUST TUMBLERS,
Hexagon, Round or Wooden
BEST AND CHEAPEST.

WM A. SWEETSER
39 Montello St., Brockton, Mass



Books for Assayers

The Assayer's Manual.

An abridged treatise on the docimastic examination of ores and furnace and other artificial products. By BRUNO KERL; from the German by W. T. BRANNT; second American edition, edited, with additions, by F. LYNWOOD GARRISON; 354 pages, illustrated cloth.....\$3

Notes on the Chemistry of Iron.

For professional men, students, iron and steel merchants and all interested in iron. Explaining the methods of analysis, and how to apply the results obtained. Third edition, revised and enlarged. By MAGNUS TROILUS; 143 pages; cloth.....\$2

System of Quantitative Chemical Analysis.

Edited by PROF. O. D. ALLEN, assisted by PROF. S. W. JOHNSON. Revised and corrected by DR. C. R. FRESSENIUS; 883 pages; cloth.....\$6

Manual of Qualitative Chemical Analysis.

Translated into the new system and newly revised by Samuel W. Johnson, M. A. Ninth edition. By DR. C. R. FRESSENIUS. 500 pages; cloth.....\$4

Quantitative Chemical Analysis by Electrolysis According to Original Methods.

Authorized translation from the German of Dr. Alex. Classen. By PROF. WM. HALE HERRICK. Teaching electrolytic methods, useful in laboratories for research, and in technical laboratories, especially those connected with metallurgical works. Cloth \$2.50

The Blowpipe in Chemistry, Mineralogy, and Geology.

Containing all known methods of anhydrous analysis, many working examples, and instructions for making apparatus. By LIEUT. COLONEL W. A. ROSS, R.A., F.G.S. With 120 illustrations; 214 pages; cloth.....\$2

The Art of Electrolytic Separation of Metals.

Theoretical and Practical. By G. GORE. Fully illustrated; 8vo, cloth.....\$3.50

A Text Book of Assaying;

for the use of students, mine managers, assayers, &c. By J. J. and S. C. BERINGER; 400 page diagrams; cloth.....\$3.25

Exercises in Quantitative Chemical Analysis.

With a short treatise on gas analysis. By W. DITTMAR.....\$1.25

Any book published sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade Street, New York.

THE GALLOWAY BOILER.

Safety, Maximum Economy in Fuel, Lowest Cost of Maintenance. Greatest Durability, Large Steam and Water Spaces.

Are the Advantages Offered by this Boiler.

SPECIFICATIONS AND PRICES UPON APPLICATION TO

EDGE MOOR IRON COMPANY,

Post Office, Wilmington, Delaware.

WILLIAM SELLERS, Pres't.

JOHN SELLERS, Jr., Vice-Pres't.

H. B. BRADFORD, Supt.

WM. F. SELLERS, Secretary.

WILLIAM H. CONNELL, Treasurer.

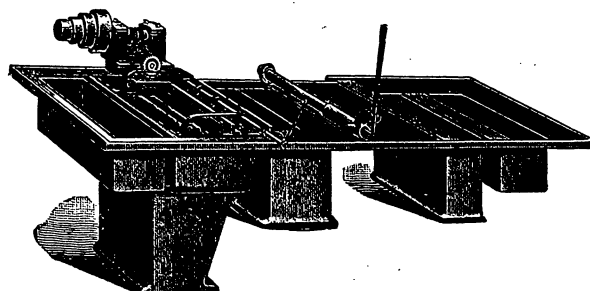
F. W. HEISLER, Purchasing Agent.



THE LLOYD BOOTH CO.,

YOUNGSTOWN, OHIO.

Tinning
MACHINERY.



Rolling Mills,
Sand and Chilli
ROLLS.

THE GARTLAND FOUNDRY CO.,

MANUFACTURERS OF

Light Work our
Specialty.

Soft Grey Iron Castings.

We are prepared
to do Japanning and
Galvanizing.

UNION and ECHO STS.,
Cleveland, Canton & Southern R. R.,

CLEVELAND, O.

Haines Gauge Co.,
906 Filbert St.,
PHILADELPHIA,
PA., U. S. A.



The HAINES Automatic Micrometer Rolling
Mill GAUGE.
For reducing HOT WORK in process of rolling

ZUCKER & LEVETT CHEMICAL CO.,
10, 12 & 14 Grand Street, New York, U. S. A.

NICKEL PLATING OUTFITS,

Dynamos and Motors for Light, Power and Electro-plating.

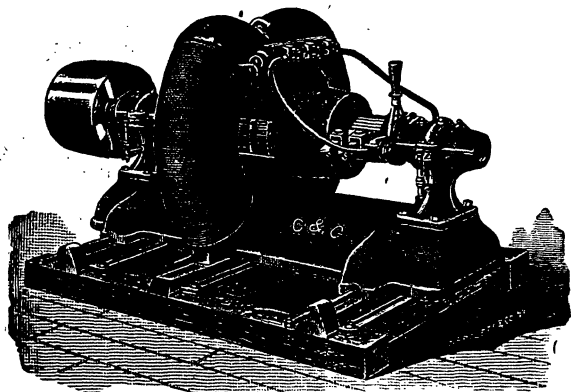
Send for Catalogue of
NICKEL AND ELECTRO-PLATING SUPPLIES AND POLISHING MATERIAL.

C. & C. ELECTRIC MOTORS AND DYNAMOS

Highest Electrical Efficiency.
Best Mechanical Construction.

Electric Pumps, Hoists, Fans, Blowers, Etc.

Large experience in and special attention paid to electrical transmission of power in factories.



THE C. & C. ELECTRIC MOTOR CO.

GENERAL OFFICES:

402 and 404 Greenwich St., New York.

BRANCH OFFICES:

CHICAGO,
201 Madison Street.

BOSTON,
63 Oliver Street.

AGENCIES IN ALL PRINCIPAL CITIES.

DYNAMOS

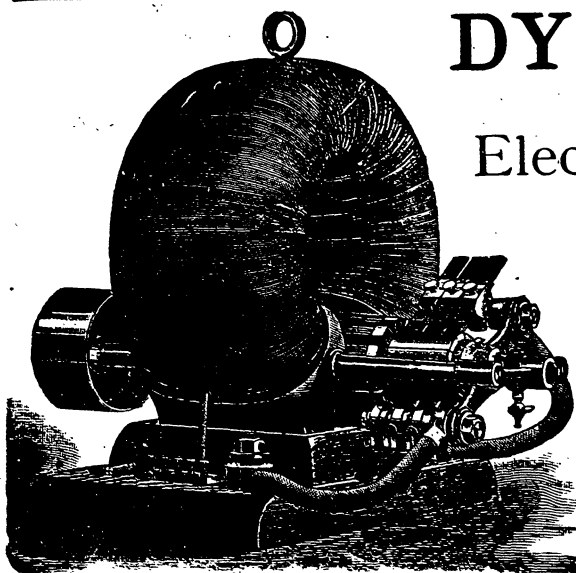
—FOR—

Electro-Plating.

**SIMPLE,
DURABLE and
EFFICIENT.**

The Best Machine Made.
Satisfaction Guaranteed.

—THE—
Eddy Electric Mfg. Co.
Windsor, Conn.



The Improved WHARTON-HARRISON SAFETY BOILER,

For all Power and Heating Purposes.
Single Boilers 2-240 H.-P.
Batteries of any Capacity.

**THE COCHRANE
FEEDWATER HEATER.**

**THE COCHRANE
FEEDWATER HEATER & PURIFIER.**

THE COCHRANE
SEPARATOR.

Horizontal or Vertical Form. For Obtaining
Dry Steam. Purified Exhaust.

MANUFACTURED BY
HARRISON SAFETY BOILER WORKS,
Germantown Junction. PHILADELPHIA, PA.

CHAPMAN VALVE MFG. CO.

Manufacturers of

VALVES & GATES

For Water, Steam, Gas,
Ammonia, &c.

GATE FIRE HYDRANTS,
With and without independent outlets.

We make a specialty of Valves with Bronze seats for High Pressure steam.

Works and General Office,
INDIAN ORCHARD, MASS.

Treasurer's Office,
72 Kilby and 112 Milk Streets,

Boston, Mass.

Chicago Office, 24 West Lake St. New York Office
28 Platt Street.



Triple and Quadruple Expansion Engines
and Boilers and their Management. By
A. RITCHIE LEASK. 59 illustrations, 12mo, cloth.
\$2.00

For Sale by David Williams 96-192 Reade St., N. Y.

HARRISBURG Foundry and Machine WORKS

General Office and Works: HARRISBURG, PA., U. S. A.

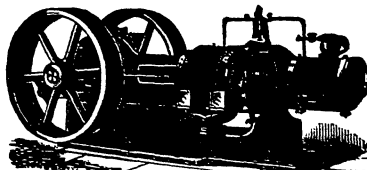
**THE HARRISBURG
Ideal Tandem Compound Engine.**

**SUPERIOR REGULATION.
PERFECT EQUILIBRIUM IN ACTION.
HIGHEST ECONOMY**

W. R. FLEMING & CO.,
New York and New England.
NEW YORK OFFICE, Mail and Express Bldg.
BOSTON OFFICE, 620 Atlantic Ave.
(Walter W. Jones, Manager.)

SELLING AGENTS:

F. E. BAILEY, Philadelphia,
24 S. 7th St., Builder's Exchange
H. E. BALDWIN, Cincinnati,
Perrin Bldg, 5th and Race Sts.



THE ALLENTOWN ROLLING MILLS,

MANUFACTURERS OF

Plg Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Fish Plates, Bolts, Nuts and Spikes.

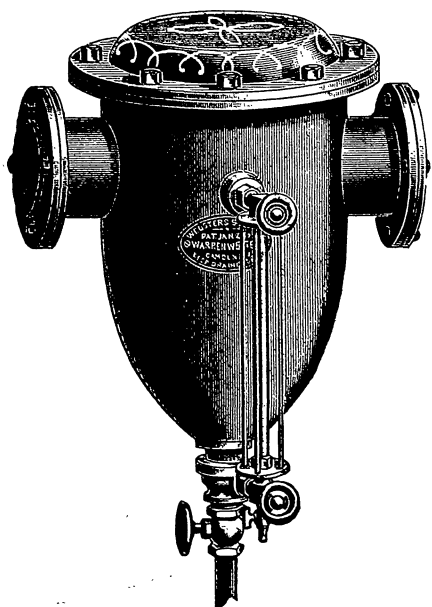
Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Machinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders of all classes of Machinery. Makers of Castings of all descriptions for Cable and Electric Railway.

ALLENTOWN, PA.

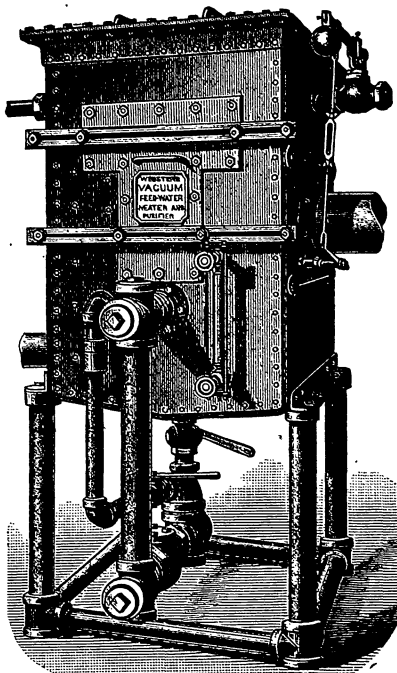
THE 4000 HORSE POWER Webster Vacuum Feed Water Heater and Purifier

Is the largest Feed Water Heater in Practical Operation at the
World's Columbian Exposition, and can be seen in Boiler
Room of Machinery Hall.

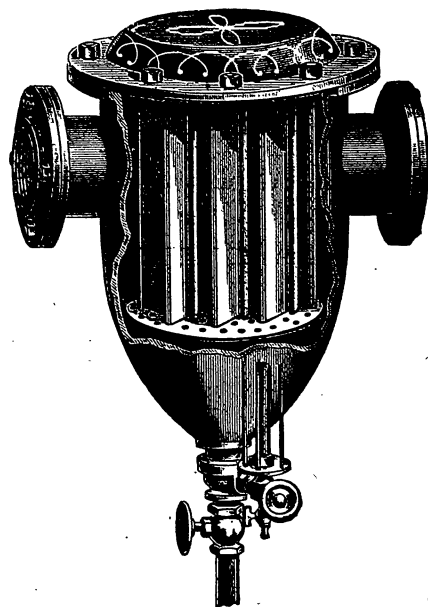
Patented Jan. 24, 1893.
No. 490,461.



THE WEBSTER OIL EXTRACTOR.



THE WEBSTER VACUUM FEED WATER
HEATER AND PURIFIER.



THE WEBSTER STEAM SEPARATOR.

SOLE LICENSEES IN THE U. S. FOR THE "WILLIAMES" VACUUM SYSTEM OF **STEAM HEATING,**

UTILIZING EXHAUST STEAM WITHOUT BACK PRESSURE UPON ENGINES, PUMPS, ETC.

SPECIALISTS

in examining steam plants where increased efficiency and greater economy is desired in heating feed water for steam boilers; also warming buildings by the utilization of exhaust steam without back pressure upon the engine irrespective of present heaters or methods employed.

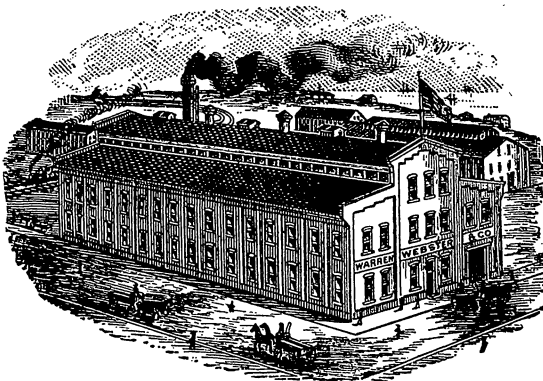
EXAMINATIONS AND ESTIMATES FREE.

SEND FOR CATALOGUES.

FOR SALE.—Feed Water Heaters, slightly used, of other makes, taken by us in part payment, where the Webster Vacuum Heater has recently been adopted. Send for List and Prices.

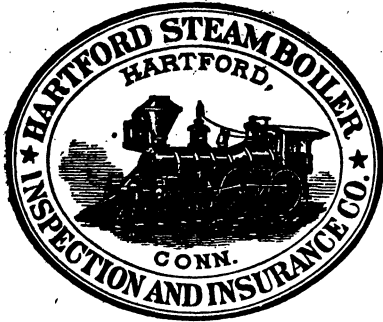
WARREN WEBSTER & CO.,

Main Office " " CAMDEN, N. J.
and Works,



BRANCHES:
CHICAGO,
NEW YORK.

AGENCIES:
BOSTON,
PITTSBURGH,
HARRISBURG,
CLEVELAND,
CINCINNATI,
BUFFALO,
SAN FRANCISCO.
Darling Bros., 112 Queen St., Montreal, Can



THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas.

BOARD OF DIRECTORS:

J. M. ALLEN, President.
 FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.
 CHARLES M. BRACH, of Beach & Co.
 DANIEL PHILLIPS, of Adams Express Company.
 RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.
 THOMAS O. ENDERS, of the United States Bank.
 LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.
 GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.
 NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.
 HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.
 A. W. JILLSON, late Vice-Prest. Phoenix Fire Insurance Co., Hartford, Conn.
 EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.
 GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.
 HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.
 C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.
 PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

GLOBE PACKING.

FOR STEAM ENGINES, PISTON RODS
 MINING PUMPS,
 HYDRAULIC LIFTS, ICE MACHINES, ETC.

None genuine without this TRADE-MARK on the MUSLIN cover.

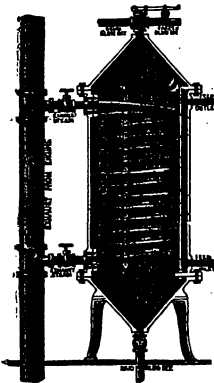


AGENCIES:

The Burnet Co., New York; W. D. Allen & Co., Chicago; Ensign & McGuffee, San Francisco; T. K. Carey & Bro., Baltimore; Charlotte Supply Co., Charlotte; Waters & Garland, Louisville; Southern R. R. Supply Co., Richmond, and others.

Ask your supply dealers for it or order from agents or from makers,

JAS. H. BILLINGTON & CO.
 PHILADELPHIA, PA.



THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - Boston, Mass.

What you get when you buy the AMERICAN HEATERS:

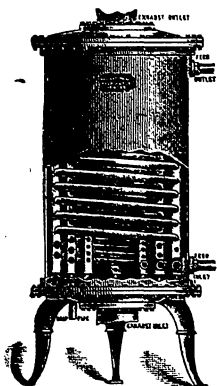
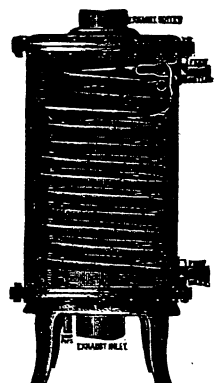
COPPER COILS,
 SOLIDLY BRAZED,
 GUN METAL FITTINGS
 AND CLAMP STAYS,
 STEEL SHELLS,

NO RUSTING OUT,
 NO LEAKY JOINTS,
 NO TROUBLE FROM EXPANSION,
 NO BACK PRESSURE,
 NO OIL IN BOILER.

We guarantee this Heater to be the Most Durable, Effective and Cheapest.

WHITLOCK COIL PIPE CO.,

27 South Street, - - - Elmwood, Conn.



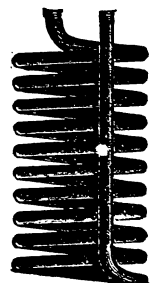
The National Feed Water Heater

is a BRASS COIL HEATER, delivering water to the boilers at 212° Fahrenheit. It is low in price, but unequalled in efficiency. 500,000 H. P. in daily use attests its merits.

Coils and Bends of Iron, Brass, and Copper Pipe.

THE NATIONAL PIPE BENDING CO.,

95 River St., New Haven, Conn.



THE EYNON-EVANS MANUFACTURING CO.,

Patentees and Manufacturers of **THE EYNON-KORTING COMPOUND INJECTORS.**

Extra Heavy Globe and Angle Valves. Brass Castings up to 5000 lbs.

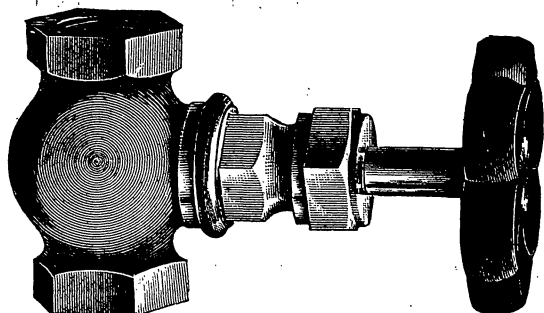
Blowers, Ventilators, Blast Nozzles, Exhausters, Brass Syphons, Acid Syphons, Condensers.

Fifteenth and Clearfield Sts., Philadelphia, Pa.

**BLAST FURNACES,
ROLLING MILLS,
STEEL WORKS,
MINES, ETC.,
ETC.**



**OIL WELLS,
REFINERIES,
ELECTRIC LIGHT PLANTS
WATER WORKS, ETC.,
ETC.**



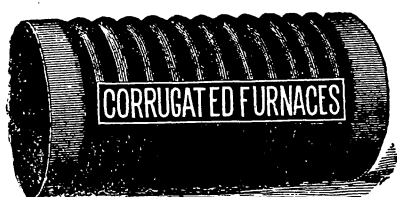
McNAB & HARLIN MFG. CO.,
—MANUFACTURERS OF—
BRASS COCKS AND VALVES
For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless
Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



THE CONTINENTAL IRON WORKS.

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS OF—

CORRUGATED FURNACES, FOR MARINE AND LAND BOILERS.

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Thos. F. Rowland, Pres.
Thos. F. Rowland, Jr., Treas.

Warren E. Hill,
Chas. H. Corbett,

Vice-Pres.

Take Ferry from East 10th or 33d Streets, N. Y., to Greenpoint.

AUTOMATIC REGISTER.

The most accurate and reliable counter manufactured. Made entirely of metal



Handsomely finished. Can be used on any machine. Send for circular.

G. EDW. OSBORN & CO.,
391, 393 & 395 State St., New Haven, Conn

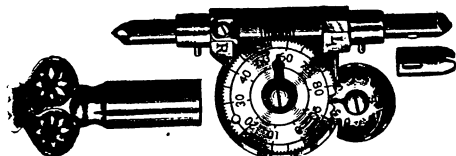
DURANT COUNTING MACHINES.



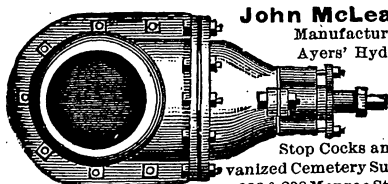
Send for
Catalogue
to

W. N. DURANT, 234 22d St., Milwaukee, Wis.,
Exhibit in Gallery, Manufacturers' Building,
World's Columbian Exposition, Section
E, Col. T-108 and active exhibit in Machinery
Hall.

**CHURCH'S DOUBLE AND SINGLE
SPEED INDICATORS.**

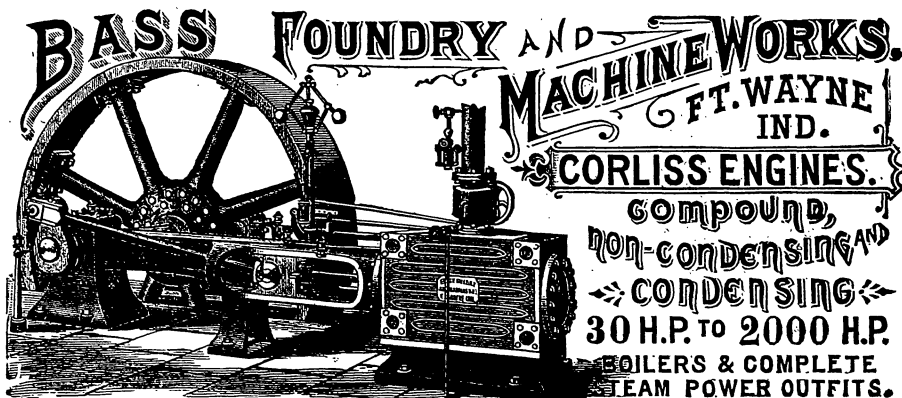


CHURCH & SLEIGHT, 109 FULTON ST., N. Y.

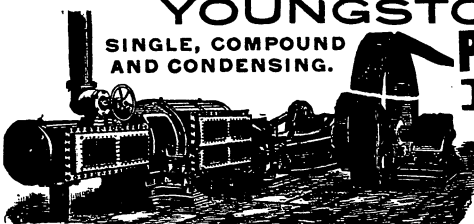


John McLean,
Manufacturer of
Ayers' Hydrants.

Stop Cocks and Gas
vanized Cemetery Supplies
296 & 298 Monroe St., N. Y.

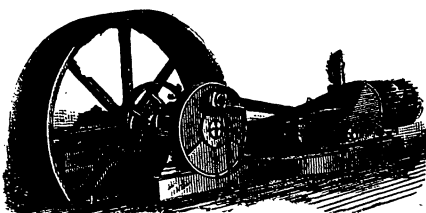


WILLIAM TOD & CO.
YOUNGSTOWN, OHIO.
SINGLE, COMPOUND
AND CONDENSING. **PORTER-HAMILTON
ENGINE**



Blowing Engines,
Hydraulic Cranes & Accumulators
Heavy Special Machinery.
ENGINE CATALOGUE ON APPLICATION.

BUCKEYE ENGINE COMPANY'S EXHIBIT AT THE WORLD'S FAIR.



20 and 32½ and two 36 x 48 Triple
Expansion, 1250 H.-P.

14 x 24 and 28 x 24 Cross Com-
pound, 325 H.-P.

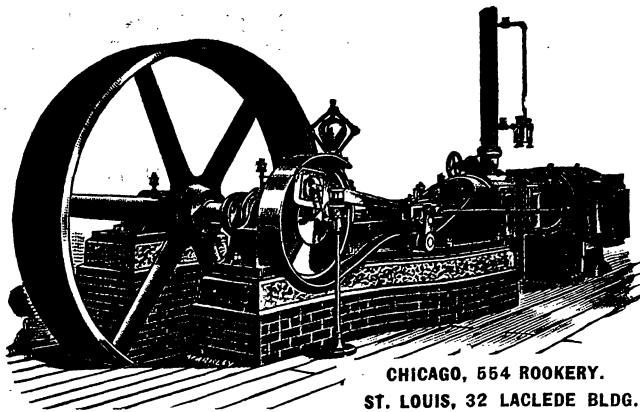
11 and 21 x 16 Tandem Compound
185 H.-P.

16½ x 30, 180 H.-P.

13 x 21, 130 H.-P.

13 x 16, 13 H.-P.

A cordial invitation is extended to all persons interested in engineering to make our exhibit in Machinery Hall their headquarters while visiting the Fair.



SOUTHWARK FOUNDRY AND MACHINE CO.

Philadelphia, Pa.

Sole Makers of

THE PORTER-ALLEN AUTOMATIC ENGINE

SIMPLE, COMPOUND
OR TRIPLE EXPANSION

Also Builders of

BLOWING ENGINES,
REVERSING ENGINES,
CENTRIFUGAL PUMPS,
BOILERS, TANKS, ETC.

CHICAGO, 554 ROOKERY.

ST. LOUIS, 32 LACLEDE BLDG.

The PHOENIX IRON WORKS COMPANY, Meadville, Pa., respectfully invites

YOU

to call and see their exhibit of "DICK & CHURCH" high speed engines, World's Columbian Exposition, Chicago, Ill., Machinery Department Building, Section C, Column No. 7.

One Single Cylinder Engine of 250 H.-P.
One Tandem Compound Engine of 250 H.-P.
One Triple Expansion Engine of 500 H.-P.

ESTABLISHED 1879. INCORPORATED 1893.

ERIE ENGINE WORKS

(CLEVELAND & HARDWICK.)

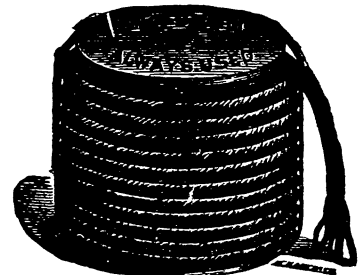


ERIE, PA.

Manufacturers of

STEAM ENGINES AND BOILERS.

ROLLASON GAS ENGINES
RELIABLE AND ECONOMICAL
Send for Catalogue, etc. HAVEMEYER BLDG. NEW YORK



Send for a Sample of
Morrison's Patent Self-Lubricating Packing,
ROBT. MORRISON,

5034 Arsenal St.,

St. Louis, Mo.

POWER FROM GASOLINE.

DIRECT FROM THE TANK.

CHEAPER THAN STEAM.

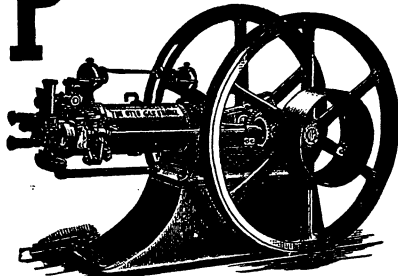
No Boiler. No Steam. No Engineer.

For Use Everywhere.

OTTO GASOLINE ENGINES,

Stationary or Portable.

1 to 50 H. P. 8 to 20 H. P



Running Expenses, Less than one cent per horse power per hour.

For large engines, one-half cent per horse power per hour.

Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply.

The Best Auxiliary Power for Night Work.

OTTO GAS ENGINE WORKS,

23d and Walnut Sts.,
PHILADELPHIA, PA.

CHICAGO OFFICE:
245 Lake St.

BOSTON OFFICE:
19 Pearl St.

E. L. MAXWELL, Pres. C. A. MOORE, Vice-Pres. H. S. MANNING, Treas. M. LUSCOMB, Sec

THE ASHCROFT MANUFACTURING COMPANY

SOLE MANUFACTURERS OF

THE TABOR STEAM ENGINE INDICATOR.

The only instrument that will make accurate diagrams at either high or low speeds. In use all over the World where accuracy is desired. Approved and adopted by United States Government on the new Cruisers.

Use the Coffin Averaging Instrument; determines the area of any irregular figure. Gives mean effective pressure (M. E. P.) of an indicator diagram without computation. Absolute accuracy. Easy to manipulate. No liability to error. One diagram per minute measured without effort.

Also Steam and Vacuum Gauges, with Patent Seamless Drawn Tube, Steam Traps, Packer Ratchet Drills, Stanwood Cutters, Marine Clocks, Engine Revolution Counters, Test Gauges, Oil Cups, Test Pumps, Locomotive Spring Balances, Steam Whistles, Salinometers, and all instruments for Measuring Steam, Air, Gas, or Water

Office and Salesroom, 411 Liberty St., N. Y.

Factory, Bridgeport, Conn.

Address all Letters to P. O. Box 3754, New York.

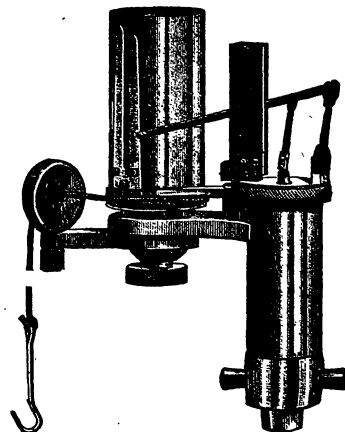
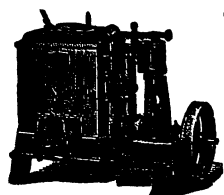


Exhibit at World's Columbian Exposition, Section No. 25 Columns K. 24 and 25, Main Center Aisle, Machinery Hall.



The Shipman Automatic Steam Engine. PETROLEUM OR KEROSENE FUEL.

1, 2, 6, 8 Horse-Power, Single.
8 and 22 Compound.

STATIONARY or MARINE.

No SKILLED ENGINEER.

SEND FOR CATALOGUE.

SHIPMAN ENGINE CO.,

200 Summer St., Boston, Mass.

New Orleans

New York

Chicago

San Francisco



SEND FOR CATALOGUE "A."

Pumps and Pumping Machinery. Part 1. By FREDERICK COLYER, M. Institute C. E. Second edition, revised and enlarged. Synopsis of contents: Lift Pumps.—Driving gear. Beer, tar, vinegar, sewage and well pumps, &c. Force pumps, various kinds. General details of lift and force pumps. Arrangement of engine and pumps. Depth of suction, water towers, &c. Sundry pumps.—Centrifugal, drainage and dock pumps, chain pumps, air pumps, blowing engines and compressors. Engines for working pumps. Horizontal high-pressure engines. Compound engines. Vertical engines. Quadruple-expansion engines. Data of working results, &c., &c. Cornish engines. Beam and bull engines. Fuel consumed. Boilers, vertical, cylindrical, Cornish, Lancashire, multitubular, patent water tube boilers, &c. Engine houses, details of construction, fittings for rooms, &c. Boiler houses. Index. 200 pages. 53 large folding plates to scale. Cloth, 8vo. \$10.00

For sale by DAVID WILLIAMS, 96-102 Reade st., N. Y.

Awarded the Grand Prize at Late Paris Exposition.

SEND FOR THIS BOOK

FREE ON APPLICATION.

BABCOCK & WILCOX CO. WATER TUBE

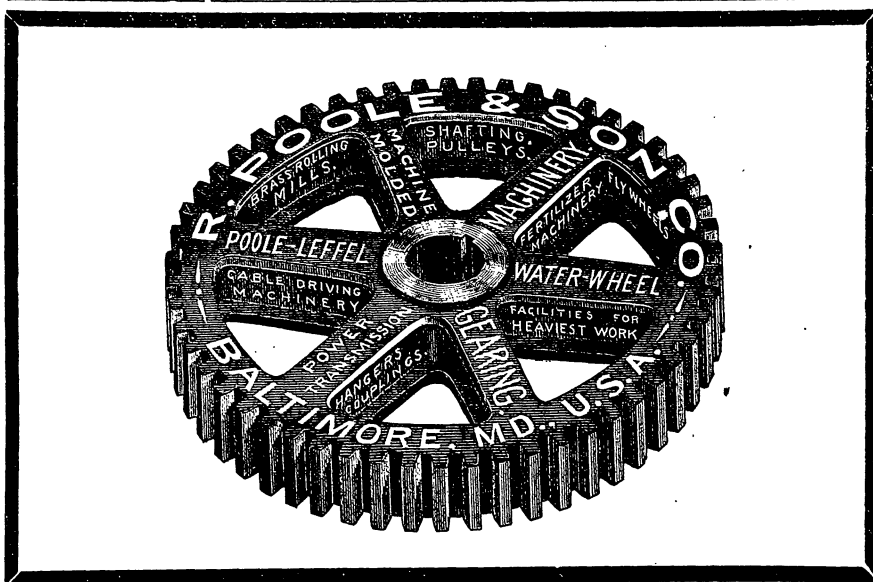
30 CORTLANDT ST. N.Y.

BRANCH OFFICES:

BOSTON, MASS. 8 OLIVER ST.
PHILADELPHIA, PA. 32 N. 5TH ST.
PITTSBURGH, PA. 408 LEWIS BLOCK
CLEVELAND, O. 412 PERRY-PAYNE BLDG.
CHICAGO, ILL. 45 S. JEFFERSON ST.
MINNEAPOLIS, MINN. 604 CORN EX.
NEW ORLEANS, LA. 57 CARondelet ST.
HAVANA, CUBA. 116 CALLE DE LA HABANA.

MANUFACTORIES IN UNITED STATES, SCOTLAND, FRANCE, GERMANY & AUSTRIA.

STEAM BOILERS



ROCK DRILLING AND AIR COMPRESSING

MACHINERY

—FOR—

TUNNELS, QUARRIES,

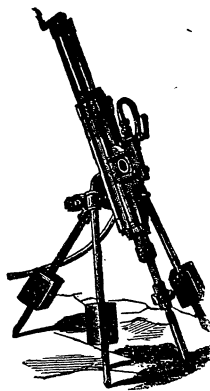
MINES, RAILROADS,

And wherever Ore and Rock are to be Drilled and Blasted.

RAND DRILL CO.,

23 Park Place, New York.

Branch Offices: Monadnock Building, Chicago; Ishpeming, Mich.; 1316 18th Street, Denver; Sherbrooke, P. Q., Canada; Apartado 830, Mexico City.



IRON CASTINGS of all kinds to order.

Drill Press and PLANER CHUCKS

UNIVERSAL PORTABLE RADIAL DRILLS. HIGH PRESSURE VERTICAL ENGINES.
HORIZONTAL STATIONARY ENGINES.

CRANES, Hand and Power, Steam and Hydraulic.

Diamond Pointed Core PROSPECTING DRILLS.

Can Turn 22 Feet Diameter.

MACHINERY of all kinds built to order.

MINERAL LANDS PROSPECTED and Artesian Wells Bored, by Contract.

PENNSYLVANIA DIAMOND DRILL & MANUFACTURING CO. - BIRDSBORO, PA.

CHICAGO MACHINERY & ENGINEERING CO., Western Sales Agents. Chicago, Ill.

BOSTON GEAR WORKS

37 Hartford St., Boston, Mass.

HEADQUARTERS FOR GEARS.

Book on Gears, 170 Illustrations, \$1.00. Job Gear Cutting of all kinds. Spur, Bevel, Spiral, Ratchet, Worm, Rack, Elliptic, Index Plates, &c. Very small or large. Send for 1892 Catalogue; 900 sizes of Gears; FREE to any business firm.

Patent Tumbling Barrels.

MANY VARIETIES

For all Kinds of Work.

Send for new Catalogue.

HENDERSON BROS., WATERBURY, CONN

BOOKS

Mechanical and Steam Engineering.

Mechanic's, Millwright's and Engineer's Pocket Companion.

With American additions. By W. TEMPLETON. Leather; tuck\$2

Steam and Machinery Management.

A guide to the arrangement and economical management of machinery, with hints on construction and selection. By M. POWIS BALE, M. Inst. M. E., A. M. Inst. C. E. 191 pages; cloth.....\$1

Richards' Steam Engine Indicator.

A treatise on the development and application of force in the steam engine. Fourth edition, revised and enlarged. By C. T. PORTER. 273 pages; 20 plates; cloth.....\$3

Thermo-Dynamics, Heat Motors, and Refrigerating Machines

By PROF. DE VOLSON WOOD. Third edition, revised and enlarged; 432 pages; cloth....\$4

Mechanics' and Engineers' Pocket Book.

By CHAS. H. HASWELL. Fifty-fifth edition; 956 pages; leather.....\$4

Steam Boiler Explosions in Theory and Practice.

By Prof. R. H. THURSTON. Second edition illustrated; cloth.....\$1.50

Manager's Hand-Book of Modern Rules,

Tables and Data for Civil and Mechanical Engineers, Millwrights and Boiler Makers, Tool Makers, Machinists and Metal Worker's Iron and Brass Founders, &c. By W. S. HUTTON. Thick 8vo, half-bound.....\$6

A Manual of Steam Boilers,

their designs, construction and operation. For technical schools and engineers. By PROF. R. H. THURSTON. Second edition; 183 engravings in text; 671 pages; cloth..\$5

Treatise upon Cable or Rope Traction,

as applied to the working of street and other railways. Revised and enlarged from *Engineering*, London. By J. BUCENALL SMITH. Illustrated; 195 pages; cloth.....\$2.50

Complete Practical Machinist.

By JOSHUA ROSE. Embracing lathe work, vise work, drills and drilling, taps and dies, hardening and tempering, the making and use of tools, &c. Fifteenth edition; 356 illustrations; 430 pages.....\$2.50

The Car Builder's Dictionary.

An illustrated vocabulary of terms, which designate American railroad cars, their parts and attachments. Revised and enlarged edition. By MATTHIAS N. FORNEY, M.E.; 358 pages; cloth.....\$3

Modern American Locomotive Engines,

their Design, Construction and Management. A practical work for practical men. By EMORY EDWARDS, M.E. Illustrated by 78 engravings; 383 pages; cloth.....\$2

Modern Steam Engines.

An elementary treatise upon the steam engine, written in plain language, for use in the workshop, as well as in the drawing office, giving full explanations of the construction of modern steam engines, including diagrams, showing their actual operation; together with complete but simple explanations of the operations of various kinds of valves, valve motions and link motions, &c., thereby enabling the ordinary engineer to clearly understand the principles involved in their construction and use, and to plot out their movements upon the drawing board. By JOSHUA ROSE, M.E. Illustrated by 423 engravings; 321 pages, 10 x 12 inches; cloth.....\$6

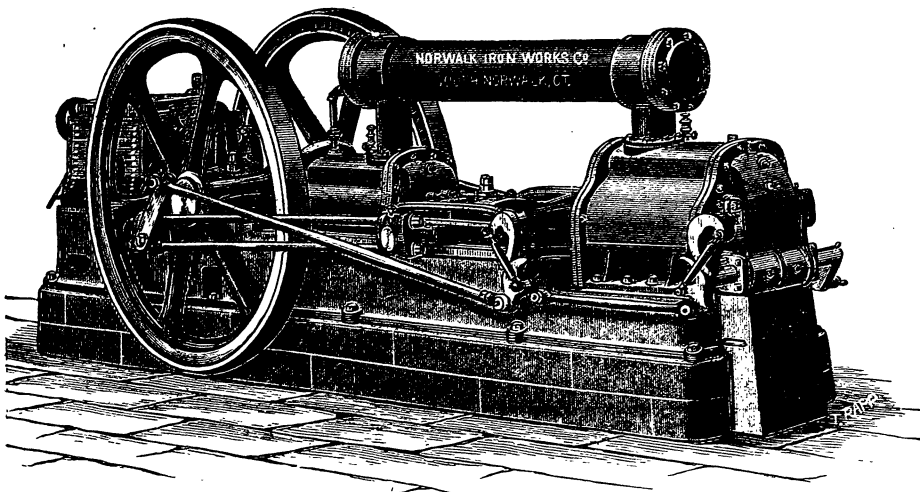
Any Book published sent, post-paid, upon receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller,

96 - 102 Reade St., New York.

Air Compressors.



THE NORWALK IRON WORKS CO., South Norwalk, Conn.

DEAN BROTHERS

Steam Pump Works,

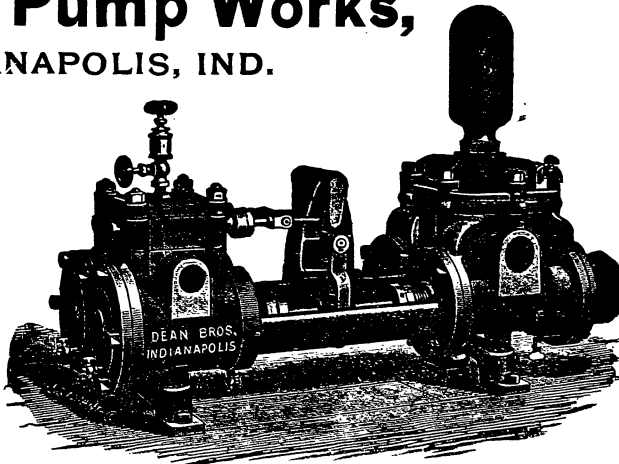
INDIANAPOLIS, IND.

DUPLEX PUMPS.

SINGLE PUMPS.

**DEEP WELL
PUMPS.**

Send for Catalogue
and Prices.



**CHEAPEST.
HANDIEST.
SIMPLEST.**

PUMPS.
Handling Dirty, Gritty and Sandy Liquids, without Wear, Oil or Care. Pumping outfits for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging.

MASLINS, 165-167 First St., Jersey City, N.J.

SEAMLESS

COPPER FLOATS

AND

AIR CHAMBERS.

to stand 50% more pressure than any other make.

SEND FOR PRICES.

**SPRINGFIELD BRASS CO.,
SPRINGFIELD, MASS.**

Made in all sizes

and shapes by a

No.

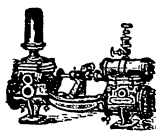
Process.

Guaranteed

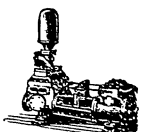
to stand 50%

more pressure than any other make.

SEND FOR PRICES.

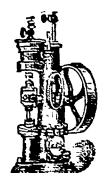


Send
for
Prices.



VALLEY PUMP CO.

Easthampton, Mass.



The GEO. BURNHAM CO.,

Worcester, Mass

CATA-

LOGUE

E



**The
Best 16-in
Lever Drill Made**



Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

Worthington Steam Pumps

CONDENSERS and WATER METERS.

HENRY R. WORTHINGTON,

86 & 88 LIBERTY STREET, NEW YORK.

BOSTON,

ST. LOUIS,

PHILADELPHIA,

DENVER.

CHICAGO

The WATERBURY-FARREL POUNDRY & MACHINE CO., Waterbury, Connecticut,

Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from Sheet Brass, Copper, Steel Silver, &c. **POWER PRESSES, HYDRAULIC PRESSES,** Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

The Brown Hoisting and Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.,

Sole manufacturers of the

"BROWN HOIST"

A NEW AND COMPLETE SYSTEM FOR HANDLING OF MATERIALS.

The Brown Patent Cable Tramway system.

The Brown Patent Suspended Beam Tramway system.

The Brown Patent Bridge Tramway system.

The Brown Patent Shed Tramway system.

The Brown Patent Furnace Stock Distributer.

The Brown Patent Warehouse Tramway system.

The Brown Patent Sewer Machine Tramway system.

The Brown Patent Continuous Elevated Tramway system.

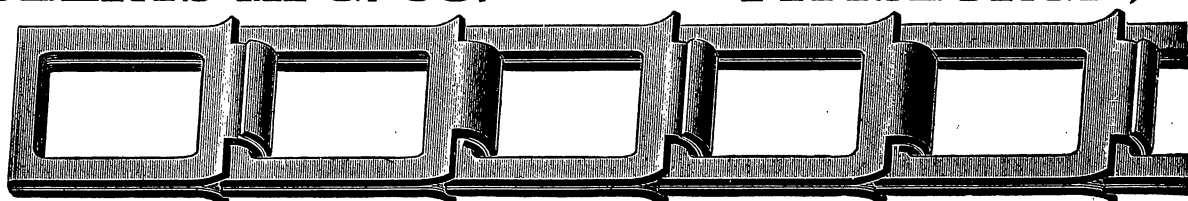
The Fayette-Brown Patent Automatic Furnace Hoist.

The Brown Patent Friction Clutch Hoisting Engine.

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

The Most Perfect Clutch.

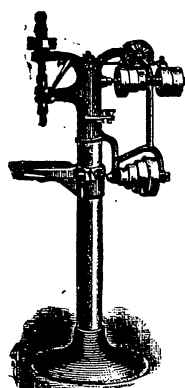
ROBERTS MFG. CO. - - - PITTSBURGH, PA.



PATENT DETACHABLE STEEL LINK BELTING,

Sprocket Wheels and Shafting.

Send for Catalogue and reduced Price-List.



The Norton Drills

for light, sensitive and rapid drilling. 1, 2, 3, 4 or more spindles, sensitive or automatic feed. To drill from 0 to 1/2-inch holes. The latest and best. Most convenient, sensitive and durable drills on the market. Have balanced spindles and balanced tables. Write for prices and description, or for special machinery.

THE

NORTON & JONES MACHINE TOOL WORKS,
PLAINVILLE, CONN.

JEFFREY CHAIN BELTING.

Also MALLEABLE, WROUGHT, STEEL AND SPECIAL CHAINS for

Elevating and Conveying Machinery

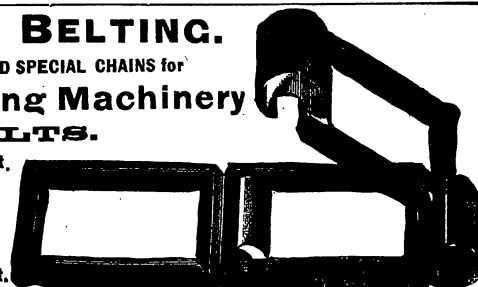
DRIVE BELTS.

Send for 1893 Catalogue and Reduced Price-List.

THE JEFFREY MANUFACTURING CO.

COLUMBUS, OHIO, U. S. A.

New York Branch, 163 Washington St.



PIPE

FROM 1-8 TO

24 in. Diameter

CUT,

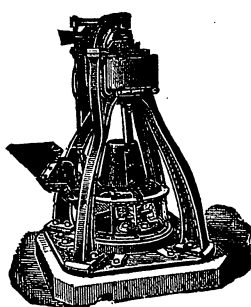
BENT,

FITTED and ERECTED
Anywhere in the U.S.

BEST, FOX & CO.,

25th & Railroad Sts.,

Pittsburgh, Pa.



THE GRIFFIN MILL

A perfect pulverizer of all refractory substances by either the wet or dry process. It works better and at less expense than any other Mill, and is conceded to be the only perfect pulverizing Mill manufactured.

For free illustrated pamphlet address

BRADLEY FERTILIZER CO., 92 State St., Boston.



ALEXANDER BROS.

BEST OAK BELTING.

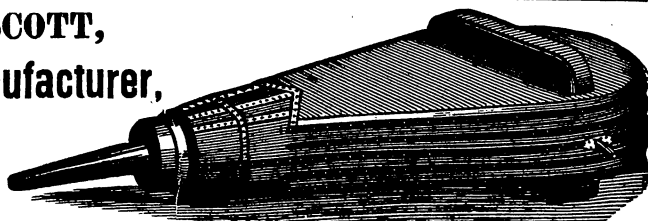
PHILADELPHIA.

GEO. M. SCOTT,
Bellows Manufacturer,

Johnson Street

Cor. 22d St.,

CHICAGO ILL.



NEW YORK BELTING & PACKING CO. LTD**JOHN H. CHEEVER,**
President.**15 Park Row, New York.**

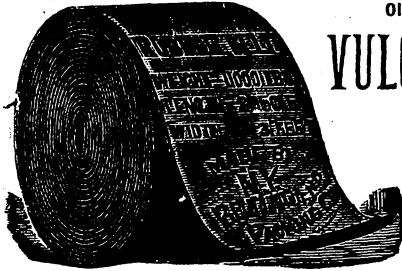
Oldest and Largest Manufacturers in the U. S. of

VULCANIZED RUBBER FABRICS

For Mechanical Purposes.

MACHINE BELTING

With Smooth Metallic Rubber Surface.

**RUBBER TEST HOSE**

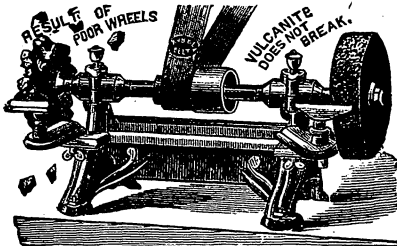
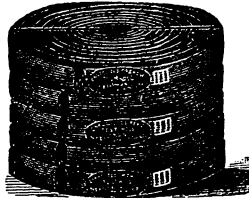
COTTON "CABLE" HOSE, CIRCULAR, WOVEN, SEAMLESS ANTISEPTIC

For the use of Steam and Hand Fire Engines, Force Pumps,

Mills, Factories and Steamers.

Rubber Cement.**THE ORIGINAL SOLID VULCANITE EMERY WHEELS.**

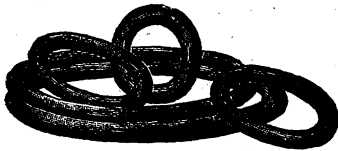
RUN EASY and SAFE, COOL and TRUE. ARE MORE DURABLE—HENCE CHEAPER. A trial will convince you of this. KNIFE GRINDING WHEELS A SPECIALTY.



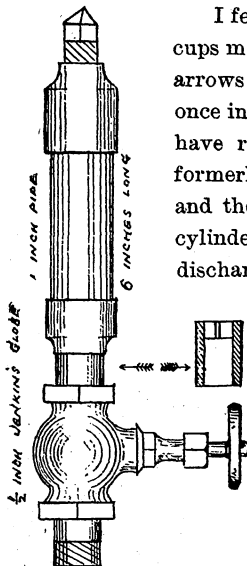
Rubber Goods to Order for all Mechanical Purposes.

SALESROOMS:PHILADELPHIA, 308 Chestnut St.
BOSTON, 44 Summer St.
CHICAGO, 151 Lake St.
DENVER, 1601-1611 17th St.
CHARLESTON, 160 Meeting St.
CINCINNATI, 227 West 4th St.
MINNEAPOLIS, 200 1st Ave South.
CLEVELAND, 176 Superior St.**SALESROOMS:**SAN FRANCISCO, 17 Main St.
DETROIT, 16-20 Woodward Ave.
BALTIMORE, 12 N. Charles St.
NEW ORLEANS, 4-12 N. Peters St.
KANSAS CITY, 1311 and 1313 W. 12th St.
ST. LOUIS, 616 Locust St.
DALLAS, 173 Elm St.**H. O. CANFIELD,**

MOULDED BRIDGEPORT, CONN.

Small moulded work a specialty. Send for estimates for moulds and work.
RUBBER GOODS FOR MECHANICAL PURPOSES.

An Experienced Engineer's Manner of Using

Dixon's Lubricating Graphite.

I feed Dixon's pure flake graphite into the steam chest with cups made from piping, as per sketch. In the nipple indicated by arrows I drive in a brass plug and drill a $\frac{1}{16}$ in. hole. I fill the cup once in three days and the steam takes care of the graphite. I have reduced the feed of cylinder oil one-half of the amount formerly used. I put one cup on each high pressure steam chest and the exhaust carries the graphite over into the low pressure cylinder and over into the air pump. It is used three times and discharged into the river. It is not worth trying to save it to use over, as I have heard some say they do. I hope engineers generally will make themselves better acquainted with graphite and learn the difference between Dixon's pure flake graphite and the ordinary commercial plum-bago.

FRANK Y. FISHER,

Engineer Pumping Station, Dover Water Works,
Dover, N. H.

For sample and descriptive pamphlet address

JOS. DIXON CRUCIBLE CO.,
JERSEY CITY, N. J.**LEVIATHAN BELTING.**

Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

Belts for Main Driving and work of a heavy nature a specialty.

MAIN BELTING COMPANY,Sole Manufacturers,
1249-1235 Carpenter St.,
PHILADELPHIA.

248 Randolph Street, Chicago.

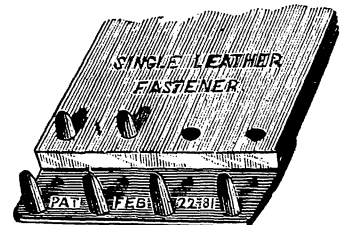
120 Pearl Street, Boston.

Send for Price-Lists and Samples.

Talcott's Clinching Belt Hooks.**W. O. TALCOTT,** Providence, R. I.
MANUFACTURER OF

Four Styles of BELT HOOKS, Including 134 Sizes.

SEND FOR CATALOGUE.

Thacher's Patent BELT FASTENERS.

Manufactured by

The Claffen Manufacturing Co., Cleveland, O.
Office, 71 and 73 Ontario St.**FOR THE "Double Triple Quick Stroke" SHAPER**

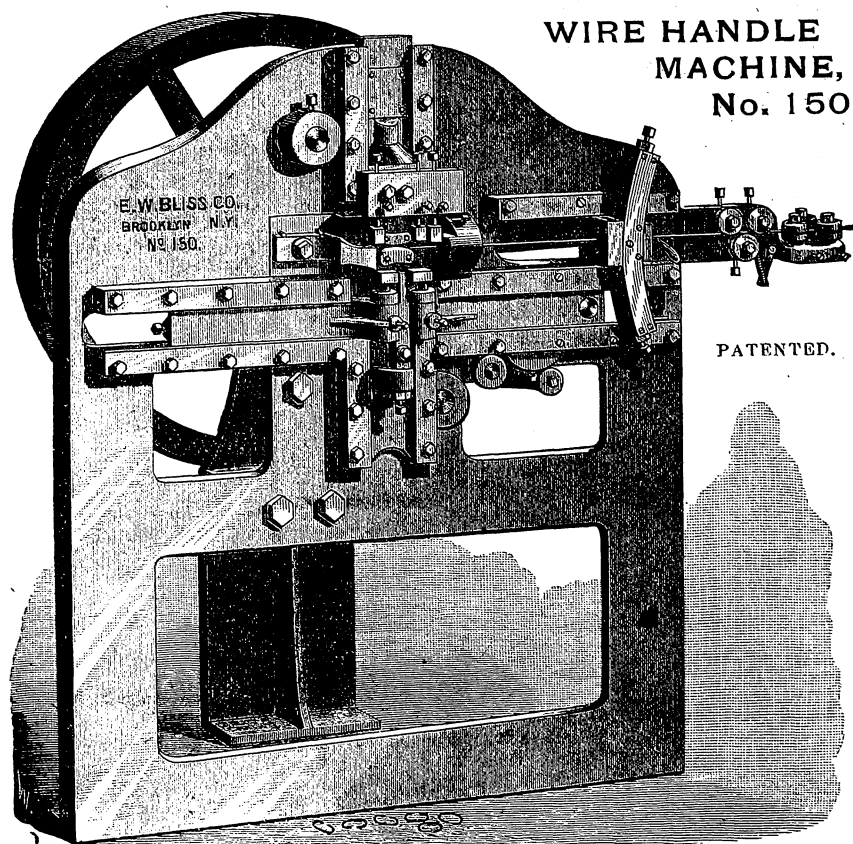
WRITE TO

GOULD & EBERHARDT, Newark, N.J.

12 in., 16 in., 20 in., 24 in., 26 in., 30 in. stroke.

E. W. BLISS CO.,

11 ADAMS STREET, BROOKLYN, N. Y.



WIRE HANDLE
MACHINE,
No. 150.

When in Chicago, call at our Exhibit, Section
28 Machinery Hall Annex.

ENTIRELY AUTOMATIC.
WILL MAKE OVAL, OR, OBLONG
HANDLES.
WILL WORK ROUND, OVAL OR
SQUARE WIRE.
CAPACITY, 85 PER MINUTE.
SEND US SAMPLE HANDLES FOR
ESTIMATES.

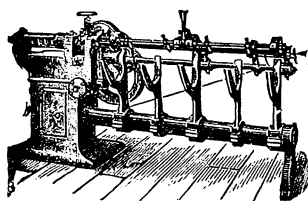
PATENTED.

PRESSES, DIES, SPECIAL MACHINERY.

CHICAGO,

14 N. CANAL ST.

Owners Also of THE STILES & PARKER PRESS CO.



Automatic Wire Straightening and Cutting Machine.

JOHN ADT & SON,

NEW HAVEN, CONN.

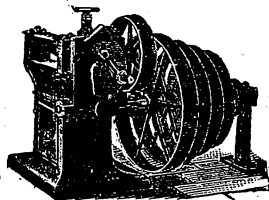
BUILDERS OF

Machinery for Hardware Manufacture.

BUTT MILLING MACHINERY,

BUTT DRILLING MACHINERY, RIVETING MACHINES, WIRE
STRAIGHTENING MACHINERY, FOOT PRESSES,

SPRUE CUTTERS, ETC.



Automatic Wire Straightening and Cutting Machine.

WRIGHT'S BUSINESS METHODS,

OR THE

Wright Key to Double-Entry Bookkeeping, Wholesale and Retail Business.

How the books are conducted ; every book described and exemplified ; its usage explained in minute detail ; a full set of books in a completed state, containing 1500 business-like entries.

JOINT STOCK ACCOUNTS.

Comprehension of the subject at last reached ; capital stock ; preferred stock ; common stock ; watered stock ; fictitious accounts not permissible, in fact not necessary ; how avoided ; "working capital" a misnomer ; stock all taken ; stock not all taken ; nominal capital ; actual capital ; stock sold above par ; stock sold below par ; stock given away ; dividend and sinking fund.

Importing Business ; also Manufacturing.

How the books are conducted in each ; their wonderful details explained in a way to reach your comprehension and meet your requirements ; information not contained in any other publication.

Expert Accounting and Chartered Accountants ; What it Means ; Their Methods Explained.

By PRINCE ALBERT WRIGHT, Practical Bookkeeper and Consulting Accountant,
PRICE \$2.50.

Any book published sent, postpaid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

RIEHLE

BROS. TESTING MACHINE CO., Phila. have issued a new describing and illustrating all the various styles of their U. S. Standard Testing Machinery with the special appliances. Marble Machinery, Rope Twisters, Loam Mills, Riehle-Roble Frictionless Ball Screw Jacks, Iron and Wooden Trucks, &c., &c. are described. It is desired to have one of these Catalogues in the office of every Superintendent, Purchasing Agent, Engineer or Manufacturer using such Machinery. A copy will be mailed free of charge to those who may apply.

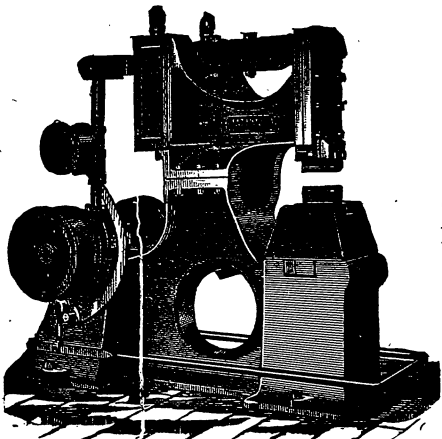
CAT. No. 3

LINK-BELT

ENGINEERING CO
NICETOWN,
PHILA
49 DEY ST.
NEW YORK

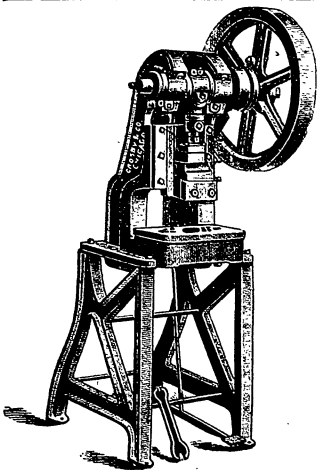
Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting
Dodge Chain, Howe Chain, &c. Western connection.
[CHICAGO,] [LINK BELT MACHINERY CO.]

JENKINS' POWER HAMMERS.



Adjustable and elastic stroke, nicety of regulation, efficiency of action, simplicity and durability of construction and the absence of leather straps, steel springs and all complication, combine to make this hammer the favorite wherever used.

JENKINS & LINGLE,
BELLEFONTE, PA.



C. A. CROSBY & CO.,
176-178 So. Clinton St., Chicago, Ill., U.S.A.

We are the largest manufacturers and originators in the West, and can make and furnish you anything in the way of

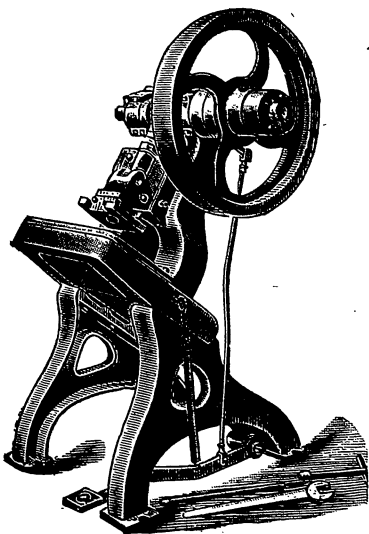
Presses, Dies and Special Machinery

For making Pieced Tinware, Lard Pails, Paint Pails, Cans for Oysters, Fish, Fruit, Vegetables, Meat, Syrup, Oil, Stove Polish, Varnish and all other Sheet Metal Packages.

AGENTS FOR THE

Clark Perfection Kerosene Oil System for Heating
Soldering Coppers and Capping Steels.

Write for Catalogue and Prices.



Presses, Dies, Presses,
OF ALL KINDS FOR
Sheet Metal Ware.

Difficult and Intricate Drawing
Stamping, Embossing, Wiring,
Blanking and Combination
Dies a Specialty.

SUBMIT SAMPLES AND WRITE FOR PRICES.

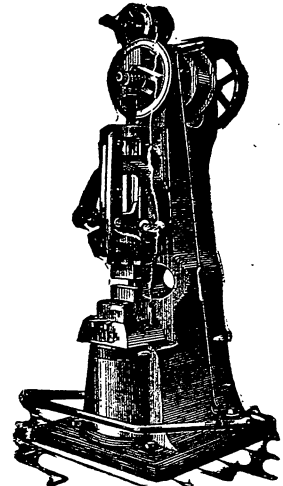
Stark Machine & Tool Co.,
BUFFALO, N. Y.

Send for Catalogue and mention "The Iron Age."

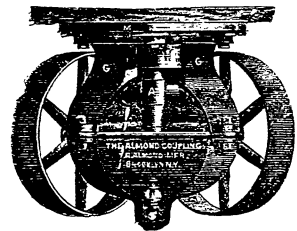
If You Use Power Hammers

Write to us for Circulars.

BELDEN MACHINE CO.
NEW HAVEN, CONN.



Chicago Office, 65 South Canal Street.



THIS CUT REPRESENTS
ALMOND'S PAT. QUARTER-TURN COUPLING
To Replace Mule Pulleys and Bevel Gears.

It is a noiseless quarter-turn countershaft, self-contained, perfectly lubricated, and gives no trouble. Send for particulars.

T. R. ALMOND, 83 and 85 Washington Street, Brooklyn, N. Y.

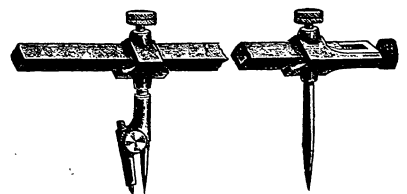
BARNES' UPRIGHT DRILLS.

Complete line, ranging from our New Friction Disk Drill, for light work, to 42-inch Back Geared Self Feed Drill.

Send for Catalogue and Prices.

W. F. & JOHN BARNES CO.
69 Ruby St., Rockford, Ill.
ENGLISH AGENTS, CHAS. CHURCHILL & CO.
2 Cross St., Finsbury, London, E. C.

Trammel for Patternmakers and Draughtsmen.

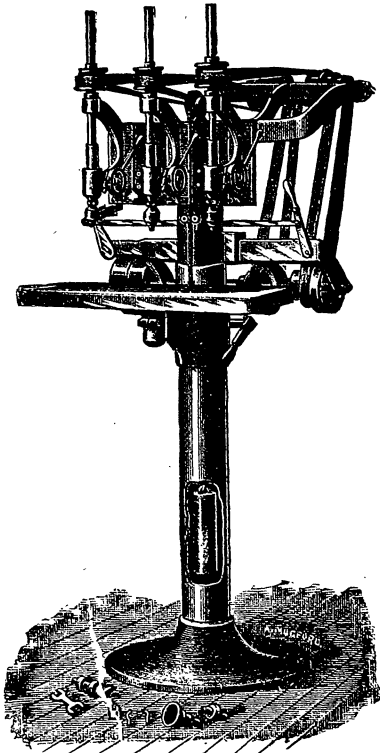


The beam is made from square brass tubing, and is very light. The points are made from the best tool steel and hardened. It also has a pencil attachment, which after placing in the same radius as the steel point can be changed from one radius to the other without changing the relation of one to the other. Trammel with pencil point \$1.50. We also furnish an extension of 14 inches with clamp at 75 cents.

HURLEY BROTHERS, Hartford, Ct.,
Makers of Fine Tools.

SIGOURNEY DRILLS.

IMPROVED.

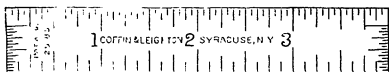


Sensitive, Strong and Interchangeable

One, Two and Three Spindles.

Counter-balanced Spindles and Tables. Vertical range of table, 30 inches, and it will swing to right or left.

SEND FOR CIRCULAR.

THE SIGOURNEY TOOL CO.,
 Hartford, Conn.
**MACHINISTS' SCALES,**

PATENT END GRADUATION.

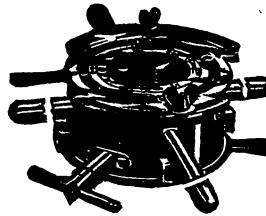
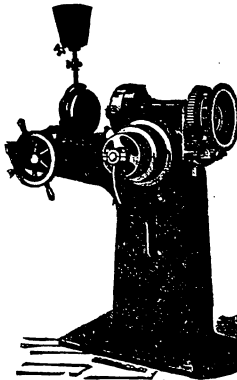
Liberal Discount to the Trade. Send for List.

COFFIN & LEIGHTON, Syracuse, N. Y.

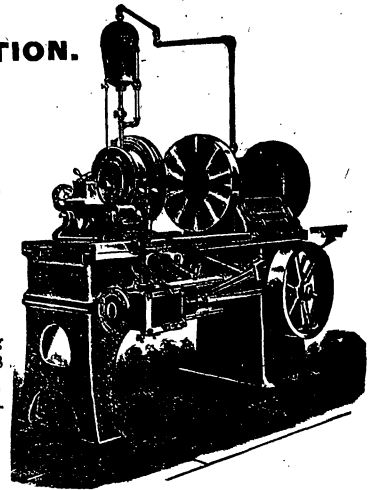
LIGHT DRILL PRESSES
MFRS. OF THE LARGEST VARIETY
SEND FOR NEW 80 PAGE CATALOGUE
DWIGHT MACHINE CO. HARTFORD, CONN.

ARMSTRONG MFG. CO.

OUR ADJUSTABLE STOCKS AND DIES are universally acknowledged to be the BEST! We also make all our Tools on the same principle of the Best Material and Workmanship, and always with a view of time and labor saving in their use.

JARECKI MFG. CO. (Limited), Erie, Pa.
**PIPE THREADING AND
 CUTTING TOOLS OF
 ALL DESCRIPTION.**


Write for Catalogue showing the most complete line of 1-8 inch to 18 inch for hand, belt, engine and with electric motor attachment.



We can furnish Bolt Threading Attachment for this Machine.

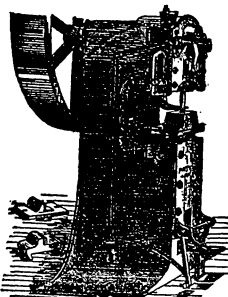
IF YOU WANT ANYTHING IN THE LINE OF
DROP PRESSES·DROP HAMMERS·STAMPS
 OR AUTOMATIC DROP LIFTERS.
 SEND FOR CATALOGUE TO
Miner & Peck Mfg. Co.
 NEW HAVEN, CONN.
 LARGEST LINE IN THE MARKET

STEEL BALLS

For all purposes, from Bicycles to the heaviest class of machinery. Write to us for prices and samples, also for information when in doubt about the proper application of balls to heavy bearings.

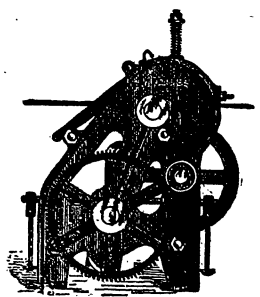
GRANT ANTI-FRICTION BALL CO.,

Fitchburg, Mass.


 Largest
 Mfrs.
 in the
 World


Machine for Punching, Shearing, Stamping, Forging, &c. The lower die-holder is movable when used for forging, stamping, bending, &c. This machine can be put up in any part of the building.

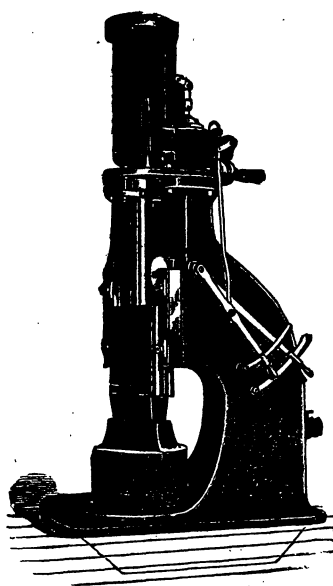
Bending Machine for Bar and Sheet Metal, for House, Boat and other work which has to be done quickly, correctly and in large quantities.

**H. A. SCHNEEKLOTH,**

Patentee and Manufacturer,

530 W. 28th St., New York.

BOOKS
 THE NEWEST BOOKS ON Iron, Steel and Metallurgy Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting, promptly supplied on receipt of price by
DAVID WILLIAMS, 96-102 Reade St., New York.



Bement, Miles & Co.,

PHILADELPHIA, PA.,
Builders of

Metal-Working Machine Tools

For railroad shops, locomotive and car builders,
machine shops, steam forges, shipyards, boiler
shops bridge works

**Steam Hammers for Working Iron
or Steel.**

NEW YORK OFFICE. Equitable Building.

GEORGE PLACE, Agent

THE STURTEVANT IMPROVED PORTABLE FORGES.

PRESSURE BLOWERS,

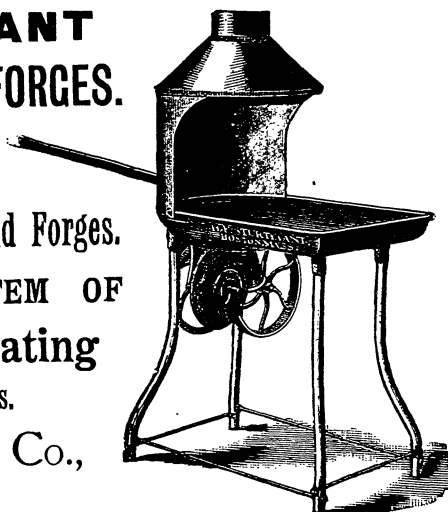
For Cupola Furnaces and Forges.

THE STURTEVANT SYSTEM OF Heating and Ventilating

Manufacturing Establishments.

B. F. STURTEVANT Co.,
BOSTON, MASS.

91 Liberty Street, New York;
16 South Canal St., Chicago.



135 North Third St.,
Philadelphia.

PITTSBURGH MFG. CO.,

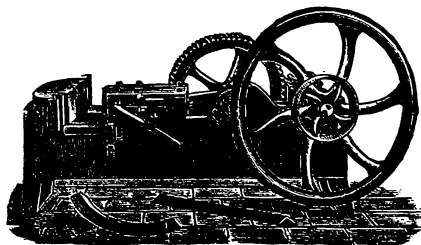
Manufacturers of

**Crosgrove's Patent Straight-
ening, Bending and Punch-
ing Machines.**

NAIL MACHINERY.

Bolts, Nuts, Rivets, Castings, &c.

PITTSBURGH - - PA

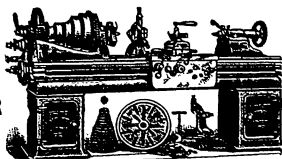


FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

FITCHBURG

AND OTHER



18-inch Engine Lathe.

ENGINE LATHE

METAL-WORKING MACHINES.

FITCHBURG

MASS.

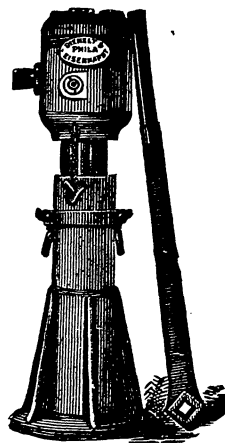
SEND FOR
CATALOGUE B.

RELIANCE HYDRAULIC JACKS.

SUPERIOR TO ANY JACK NOW MADE.

Absolute in its actions in any position.

Under complete and instantaneous control.



MADE IN FOUR SIZES,
10, 15, 20 and 30-ton capacity, to lift 10 or 18
inches. Broad Base of Ground Lift.

OIENELT & EISENHARDT

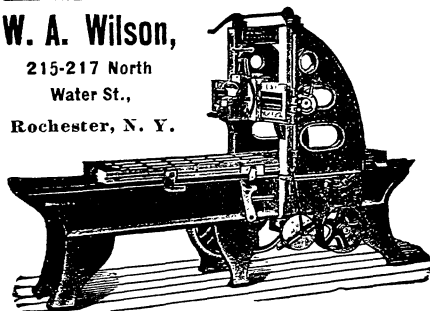
Makers,

1308 Howard Street, Philadelphia.

W. A. Wilson,

215-217 North
Water St.,

Rochester, N. Y.

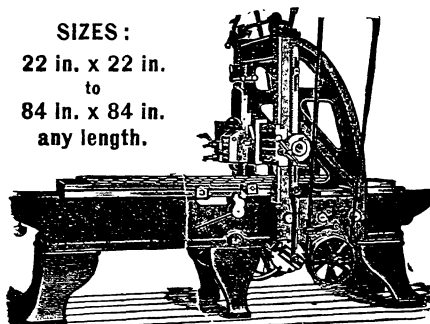


Improved Iron Planers a specialty. 20 x 20, 22 x 22
24 x 24 up to 42 x 42, to plane any length. Send for
description and price-list before purchasing. Manu-
facturers' agent for other tools and machinery. Men-
tion *The Iron Age*.

THE POWELL PLANER CO.

SIZES:

22 in. x 22 in.
to
84 in. x 84 in.
any length.



WORCESTER, MASS.

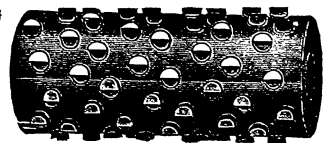
Ingersoll Milling Machine Co.,

Rockford, Ill.

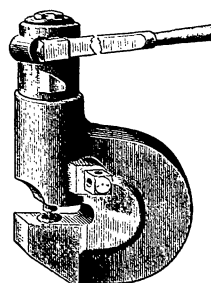
SLAB MILLING MACHINES

UP TO 36 IN. SQUARE, WEIGHING 22,000 LBS.

Milling
Cutters
of any
Shape.



PATENTED DEC. 21, 1889.



A. L. HENDERER,
Wilmington, Del.,

Manufacturer of

Hydraulic

Punches,

Screw Punches,

Forged Steel Expand-
ers, Flue Hole Cutters,
Boiler Test Pumps and
Pipe Vises.

Price-lists and discounts
on application.

PATENT RAW HIDE BOUND MALLETS & CHISEL HANDLES
POSITIVELY WILL NOT SPLIT.

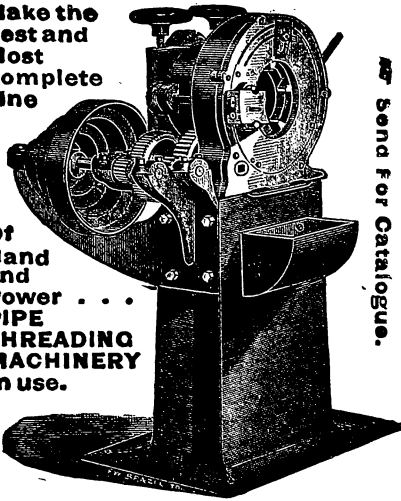
PATENT RAW HIDE PINIONS
ESPECIALLY ADAPTED TO HIGH SPEED MACHINERY. NOISELESS!
MORE DURABLE THAN METAL. NO LUBRICANT REQUIRED.

NEW PROCESS RAW HIDE CO.
PATENTEES & SOLE MANUFACTURERS SYRACUSE N.Y., U.S.A.

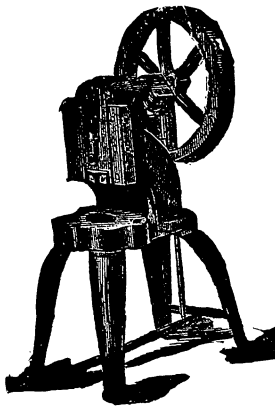
The Merrill Manufacturing Co., Toledo, Ohio,

Make the
Best and
Most
Complete
Line

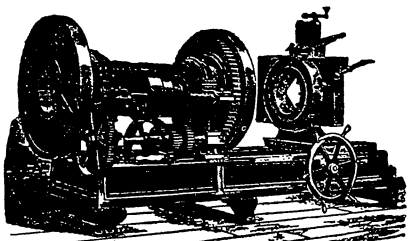
Of
Hand
and
Power . . .
**PIPE
THREADING
MACHINERY**
In use.



Send for Catalogue.



**A. H. MERRIMAN,
MERRIDEN, CONN.,**
Manufacturer of all Descriptions of
PRESSES.



BIGNALL & KEELER MFG. CO., St. Louis, MO.
MANUFACTURERS OF
Peerless Duplex Pipe Cutting and Threading
Machines. Send for Catalogue.
Our Prices are Low and our Goods are the Best.

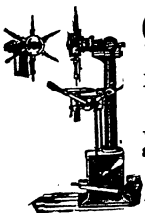
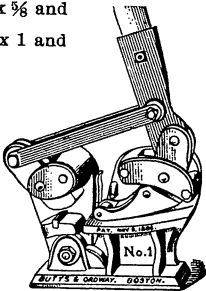
B. & O. TIRE UPSETTER. SURE GRIP.

No. 1, Upsets 3 x 5/8 and
smaller.
No. 2, Upsets 4 x 1 and
smaller.

IT IS WITHOUT A
FAULT. ONE MOTION
DOES IT ALL.

Every machine is
tested and warranted
to give satisfaction.
We confidently offer
this Upsetter as the
best to be had.

Send for Price.
BUTTS & ORDWAY,
500 Atlantic Ave.,
BOSTON, MASS.



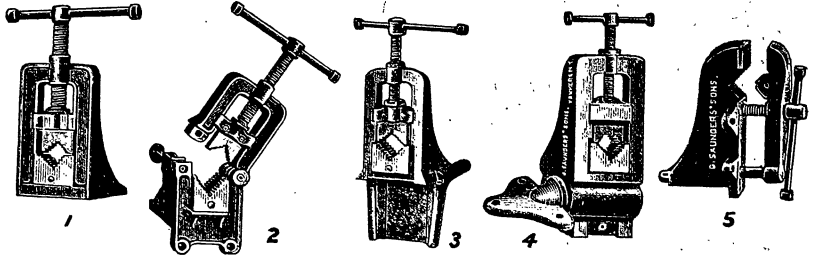
QUINT'S TURRET DRILLS

Six Spindle.
Drills from 1-32 to 1/2 hole. Speed
from 250 to 2000 rev.
Suitable for a large variety of
work and is operated with ease
and rapidity.

SEND FOR CIRCULAR.
A. D. QUINT, Hartford, Conn.

D. SAUNDERS' SONS,

Manufacturers of Improved



PIPE VISES

of all styles and sizes, holding 1/2 in. to 8 in. pipe, made of MALLEABLE IRON, CAST IRON and STEEL
Also PIPE THREADING MACHINES 1/4 in. to 16 in., Hand Pipe Cutters, Stocks and Dies, Tapping
Machines, etc. Send for catalogue to

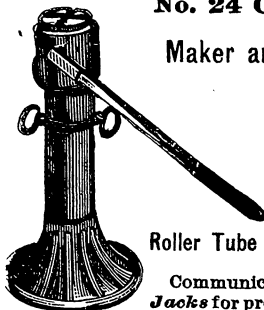
27 Atherton Street, Yonkers, N. Y.

RICHARD DUDGEON,

No. 24 Columbia Street, New York.

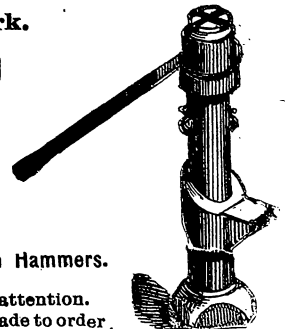
Maker and Patentee of the Improved

Hydraulic Jacks AND Punches.



Roller Tube Expanders and Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.
Jacks for pressing on Car Wheels or Crank Pins made to order.



Hand Punches and Shears

1/4 in. hole in 1/2 in. iron.

For Round, Flat, Square and Corrugated Iron.

Portable Hydraulic Beam Punches,

(1 inch hole in 1 inch iron.)

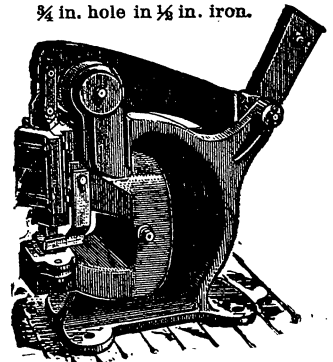
Polishing and Buffing Machinery,

IMPROVED HYDRAULIC JACKS, to raise
from 4 to 150 Tons.

Hydraulic Presses, all styles; Hydraulic Hand and Power
Pumps; Accumulators, &c.

WATSON & STILLMAN,

204, 206, 208, 210 E. 43d Street, New York.



\$ Saved

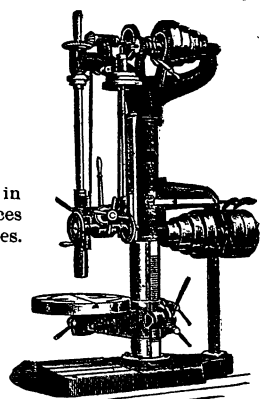
IS A DOLLAR MADE.

If you need a Drill Press, any size, either now or in
the near future, we advise you to write for prices
immediately. Superior tools at extremely low prices.
Address

THE HAMILTON MACHINE TOOL COMPANY,

WEST MARKET STREET,

Hamilton, - Ohio, U. S. A.



Jack Chain Machines.

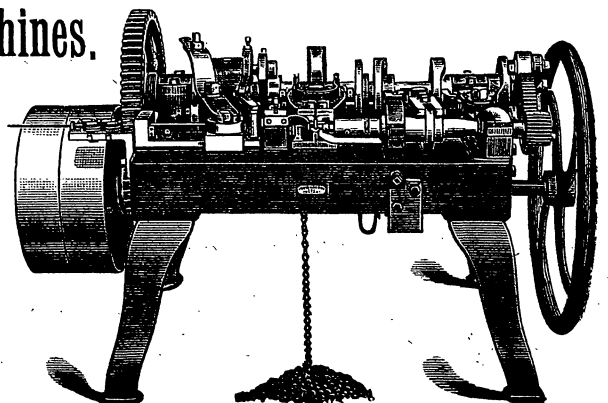
FOR BOTH DOUBLE AND
SINGLE LINKS.

Entirely automatic,
taking the wire directly
from the coil and com-
pleting chain at the rate
of 120 links per minute.

Send for prices.

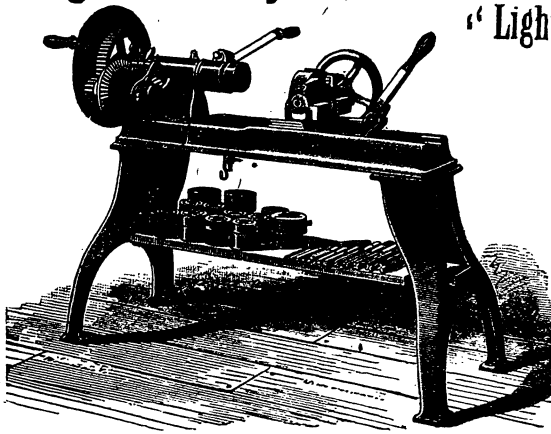
**GROSS & SPIERS MACHINE
CO.**

Waterbury, Conn.



Largest Variety of Bolt-Cutters and Screw-Plates.

"Lightning" and "Green
River" Brands.



Bolt-Cutting, Nut-Tapping and Pipe-Threading Machine, No. 10.
MANUFACTURED BY

Also Taps, Dies, Reamers, Drills,
Drilling Machines, Punching
Presses, Tire Benders, Tire Shrink-
ers, Horse Shoer's Machines Swage
Blocks, Mandrels, etc.

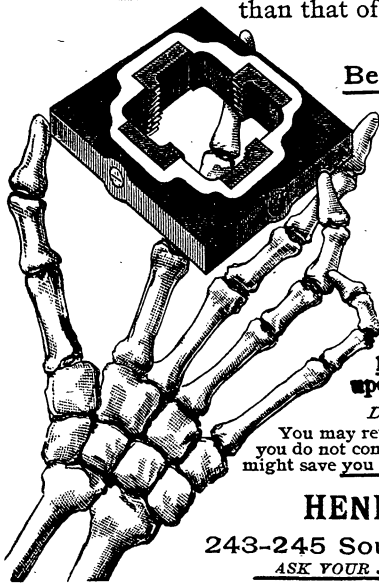
Send for New Catalogue.

WILEY & RUSSELL MFG. CO., Greenfield, Mass., U. S. A.

Maule's "Skeleton" Pipe Die

Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

The First Cost to you of MAULE'S "SKELETON" PIPE DIE is less than that of any other Pipe-Threading Die—and



Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

A sample One-inch "Skeleton" Pipe Die, either $2\frac{3}{8}$ or $2\frac{1}{2} \times \frac{3}{4}$ thick, by mail, postage prepaid, will cost you 62 cents, and will be sent upon receipt of a Postal note for that amount.

DO NOT SEND US ANY POSTAGE STAMPS.

You may return such sample to us, at our expense, if, after seeing it, you do not consider it worth the price. Don't the above sound as if it might save you some money—if TRUE?

HENRY B. PANCOAST & CO.,

243-245 South 3d Street. Philadelphia, U. S. A.
ASK YOUR JOBBER WHAT HE KNOWS ABOUT THIS TOOL.

Wire Drawing Machines, **WATERBURY**
Gang Slitters, **MACHINE CO.,**
Power Presses and Dies, Waterbury, Conn.
Tumbling Barrels, MANUFACTURERS.
Special Machinery. Send For Prices.



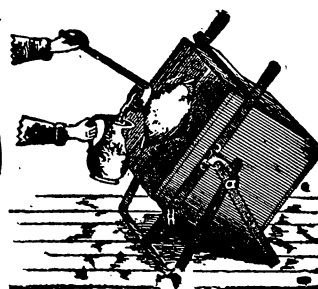
STAR LOCK WORKS, PHILA
HILLEBRAND & WOLF,
Manuf'rs of

1st QUALITY ONLY
SCANDINAVIAN
AND
SPRING PADLOCKS
Trunk & Case

Locks, Carboy

Stands, &c.

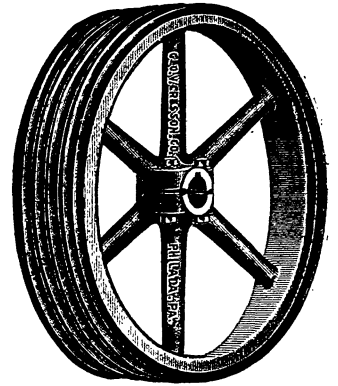
CATALOGUES SENT ON APPLICATION.



GEO. V. CRESSON CO.,

18th STREET AND ALLEGHENY AVE.

PHILADELPHIA, PA.

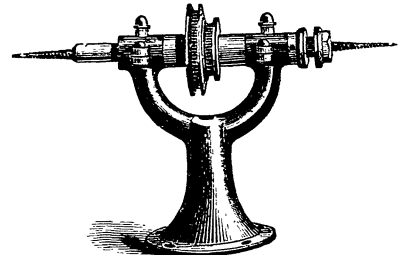


ROPE WHEELS,

All Diameters and Number of
Grooves, for Manilla, Hemp,
Cotton, or Leather Ropes.

Lathes, Chucks, Tools

OF EVERY DESCRIPTION.



Send for Prices before purchasing,

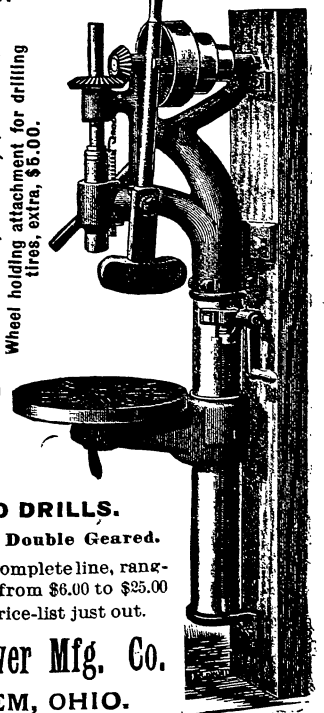
THE FRASSE CO., 19 Warren St., New York.

Silver's Power Post Drill.

FIG. 727.

Has OUT GEARS, and is a thoroughly first-class tool in all respects. Dia. Column, $4\frac{1}{4}$ in.; Dia. Spindle, 1 3-16 in.; and bored No. 2 Morse Taper; Vertical Travel, 6 in.; Drills to centre 19 in. circle.

Weight, 325 lbs.; Price, \$60.00.
Wheel holding attachment for drilling tires, extra, \$5.00.



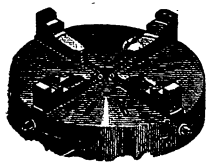
HAND DRILLS.

Single and Double Geared.

Large and complete line, ranging in price from \$6.00 to \$25.00 list. New price-list just out.

The Silver Mfg. Co.
SALEM, OHIO.

Why Band Saws Break. Sixteen reasons and how to avoid them. Being instructions to filers on the care of large band-saw blades used in the manufacture of lumber. By JOSHUA OLDHAM. 90 pages, illustrated, cloth.....\$1.00
For sale by David Williams, 96-102 Reads St., N. Y.

**SKINNER CHUCKS.**

Independent and Universal Chucks, Combination Lathe Chucks with patent reversible jaws, Drill Chucks, Planer Chucks and Face Plate Jaws

SKINNER CHUCK CO.,

SEND FOR CATALOGUE.

New Britain, Conn.

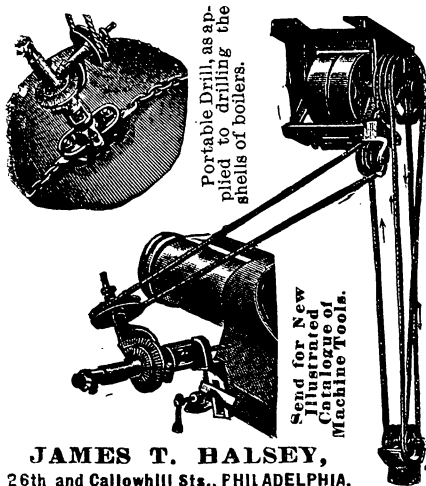
FRICITION CLUTCHES, SHAFITING, HANGERS, PULLEYS.

Sheaves for Rope Driving.
Gear Wheels.

FRICITION PULLEYS.

KEYSTONE CLUTCH AND MACHINE WORKS,

1708-1710 Germantown Ave.,
PHILADELPHIA, PA.



Portable Drill, as applied to drilling the shells of boilers.

Send for New Illustrated Catalogue of Machine Tools.

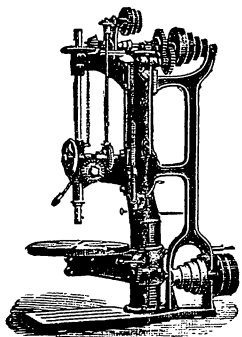
JAMES T. BALSEY,
26th and Callowhill Sts., PHILADELPHIA.

NEW HAVEN MANUF'G CO.

New Haven, Conn

Manufacturers of

Lathes,
Planers,
Shapers,
Slotters,
Etc.



Portable Drilling Machines

Manufactured by

ALBERT M. COLBURN,
Wall St., New Haven, Conn.

SEND FOR CATALOGUE.

REECE'S PATENT HAND BOLT CUTTER OR SCREW PLATE.



Send for new catalogue of
SCREW CUTTING TOOLS.
EDWARD F. REECE, Mnfr., GREENFIELD, MASS.



'CUSHMAN' CHUCKS.

We manufacture and keep in stock a full line of chucks for all purposes

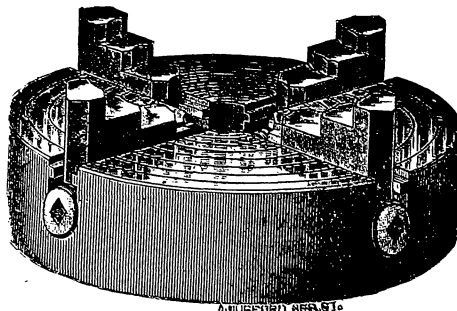
Independent 4 Jaw Chucks from 4 to 26 Inch.
Patent 4 Jaw Lathe Chucks from 4 to 26 Inch.
Reversible Face-Plate Jaws for Use on Lathes from 30 to 72 Inch.
Two-Jaw Chucks, Round and Box Body, from 4 1/2 to 18 Inch.
Universal Chucks from 2 to 21 Inch, in several styles.
Combination Chucks from 4 to 24 Inch.
Drill Chucks four styles.
Centering Chucks.
Special Chucks for Cutting-off Machines. A full line and some new improvements.

We also make a great variety of special Chucks for holding bicycle parts, valves, fittings and other special shaped pieces.

A 44-Page Catalogue Sent on Application.

THE CUSHMAN CHUCK CO., Hartford, Conn.

CHAMPION INDEPENDENT CHUCKS.

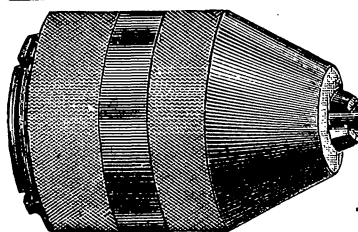


An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

THE D. E. WHITON MACHINE CO.

New London, Conn.

Sole European Agents SELIG SONNENTHAL & CO., London.



THE NEW GIANT DRILL CHUCK.

Holds a Drill With the Grip of a Giant. All Steel Parts Interchangeable.
SIMPLE IN CONSTRUCTION.

EASY TO TAKE APART AND CLEAN. BEST OF WORKMANSHIP AND VERY CHEAP. Manufactured and sold by

THE SMITH & EGGE MFG. CO., Bridgeport, Conn



THE ADJUSTABLE "DUPLEX" DIE STOCK.

Quick. Accurate. Durable.
15,000 now in use.

HART MANUFACTURING CO.,

CLEVELAND, O., U. S. A.



FOR BOLTS.

INSTANTANEOUS CLUTCH.

NO LOST MOTION.

MADE

FOR

SERVICE.



FRICITION DRILL-STOCK,

DROP-FORCED FROM STEEL.

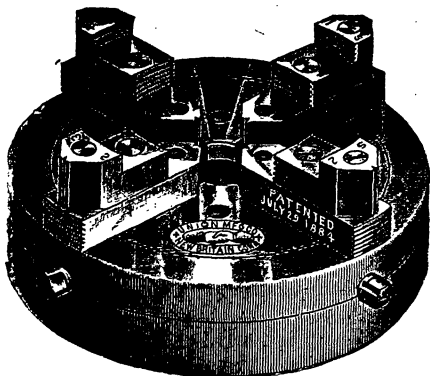
SEND FOR ILLUSTRATED CATALOGUE.

Smith Friction Drill & Tool Co., BOSTON, MASS

UNION MANUFACTURING COMPANY, NEW BRITAIN, CONN.

WAREHOUSE, 103 CHAMBERS ST., NEW YORK.

Manufacturers of Combination Chucks, Universal Chucks, Independent Chucks, Combination Reversible Jaw Chucks, Car Wheel Chucks, &c., &c.

**Union Chuck No. 21.**

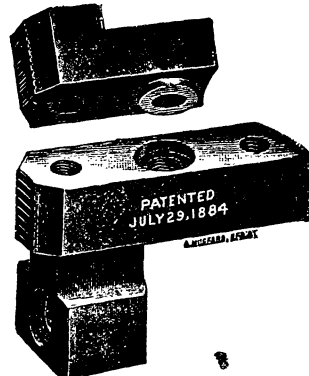
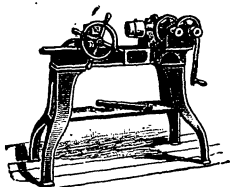
Combination with Reversible Jaws.

ALSO

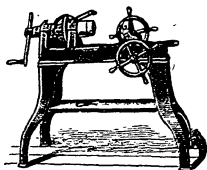
Showing Sectional Cut of Jaw.

We guarantee our Chucks in every particular.

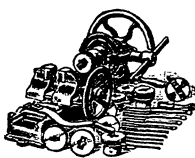
WRITE FOR CATALOGUE AND PRICE-LIST.

**BOLT CUTTERS IN GREAT VARIETY.**

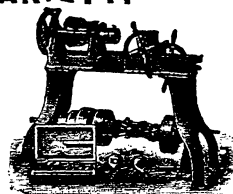
No. 9.



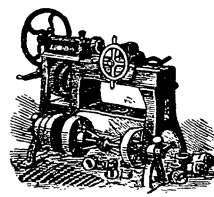
No. 8.



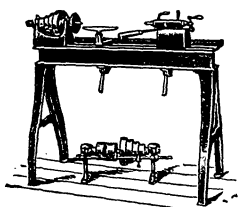
No. 7.



No. 10.



No. 12.



Speed Lathe.

MACHINISTS', BLACKSMITHS' and CARRIAGE MAKERS'
LABOR-SAVING TOOLS AND MACHINERY.
MANUFACTURED BY
WELLS BROS. & CO., - - Greenfield, Mass.

SEND FOR CATALOGUE D.

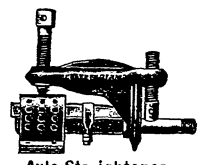


Screw Plates.

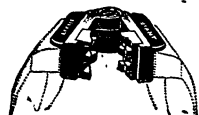
Cutting all sizes to 1½ inches.



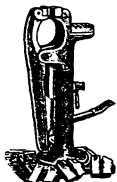
Butterflies.



Axle Straightener.



Vise Bolt Grip.



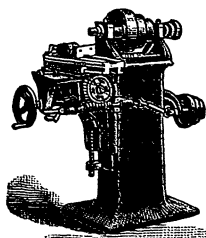
Foot Vises.



Drilling Machines.

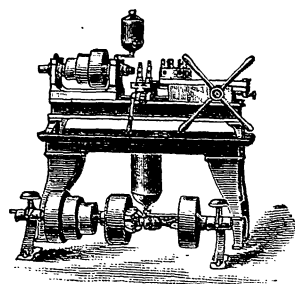
THE PRATT & WHITNEY CO.,

HARTFORD, CONN., U. S. A.,



Manufacture forging and finishing machinery with dies, fixtures, milling cutters and gauges, for the manufacture, on the American system of interchangeability of parts, of fire arms, sewing machines and bicycles: Machines and tools for finishing brass in the forms of gas fixture joints and keys, locomotive fittings and plumbers' goods, as well as studs, screws and pieces of irregular outline of circular cross section in iron, steel and other metals. Manufacturers also of single and double head milling machines, used as substitutes for planers for heavy and rapid cutting in cast iron and steel. Circular milling machines for finishing grooves of sheave pulleys, faces and sides of large gear blanks.

ASK FOR "HARDWARE CATALOGUE."



Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all. Write for catalogue.

CHAMPION BLOWER & FORCE CO, - - LANCASTER, PA.**GEORGE E. BELL,**

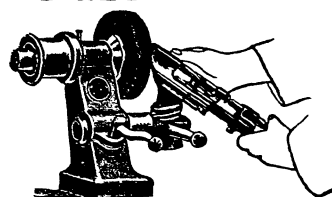
Successor to E. M. HYDE and UNION STONE CO.,

—SOLE AGENT—

Waltham Emery Wheels, WALPOLE MILLS TURKISH EMERY.

Dealer in Platers' and Polishers' Machinery and Supplies of all kinds. Foundry Supplies.

26 JOHN ST., NEW YORK.

DRILL GRINDER.

THE WASHBURN SHOPS, WORCESTER, MASS.



THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

Increase Twist Drills, Reamers, Taps, Milling Cutters and Chucks.

Taper Shank
Drills,
St. Shank Drills,
Screw-driver
Bits,
Reamers,
Shell and Solid
Taper Reamers.



Bit Stock Drills for Metal or Wood.



Wood-Boring Brace Drills, will cut off nails.

Hand Taps,
Mach. Screw Taps
"Standard" Drill
Chuck,
"Ellenwood" Drill
Chuck,
Sq. Shank Drills
for Ratchets,
Twist Drills for
Blacksmiths'
Presses

Sockets for
Taper Shank
Drills.

Reamers in
all sizes.

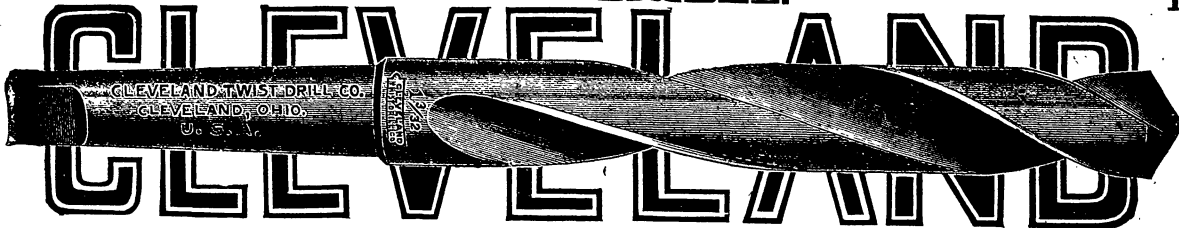
NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue.

1874

OLD RELIABLE.

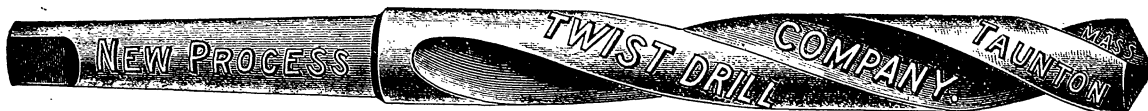
1898

Send For Catalogue.



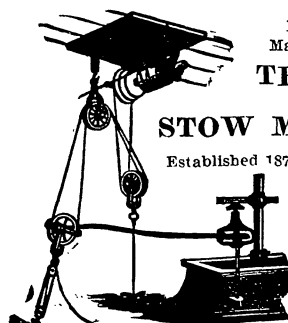
Write For Discounts.

Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.



They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

STOW FLEXIBLE SHAFT,



Invented and
Manufactured by
THE

STOW MFG. CO.,

Established 1875.

Binghamton,
N. Y.

PORTABLE.
DRILLING
TAPPING.

REAMING.

General European Agents,

SELIG SONNENTHAL & CO.,
85 Queen Victoria St., LONDON, ENGLAND.

Thos. H. Dallett & Co.

York St. and Sedgley Ave.,
PHILA.

MANUFACTURERS OF
Portable Drills, Hand
Drills, Boiler Shell Drills
Electric Motors specially
adapted for driving Ma-
chine Tools, Cranes, Ele-
vators, Pumps, Presses and
other machinery.

Complete Power and Light
Plants Installed.

Stow Flexible Shaft Co., Limited,

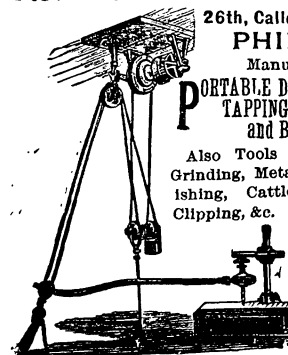
26th, Callowhill & Biddle Sts.
PHILA., PA.,

Manufacturers of
**PORTABLE DRILLING,
TAPPING, REAMING
and BORING MACHINES**

Also Tools for Emery Wheel
Grinding, Metal and Wood Pol-
ishing, Cattle Brushing and
Clipping, &c.

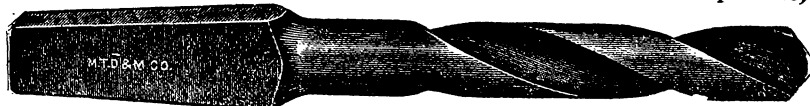
Gen'l European
Agents.

Bolling & Lowe,
2 Lawrence,
Pountney Hill,
LONDON, ENG.



Morse Twist Drill & Machine Co., NEW BEDFORD, MASS.

Manufacturers of Morse Pat. Straight-Lip Increase Twist Drills, &c.



Bit Stock Drills, Solid and Shell Reamers, Drill Grinding Machines.

Milling



Cutters,

Beach's Patent Self-Centering Chucks, and Special Tools to Order.



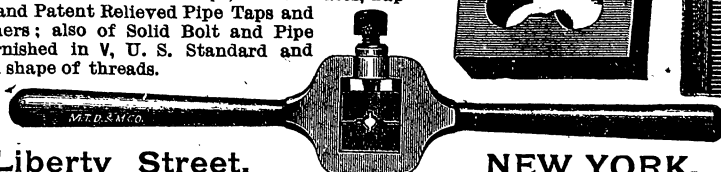
ALL TOOLS EXACT TO WHITWORTH STANDARD GAUGES.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



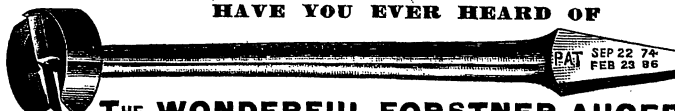
Manufacture of Patent Machine Relieved Nut, Hand,
Blacksmith and Machine Screw Taps, Screw Plates, Tap
Wrenches and Patent Relieved Pipe Taps and
Pipe Reamers; also of Solid Bolt and Pipe
Dies. Furnished in V. U. S. Standard and
Whitworth shape of threads.



111 Liberty Street,

NEW YORK.

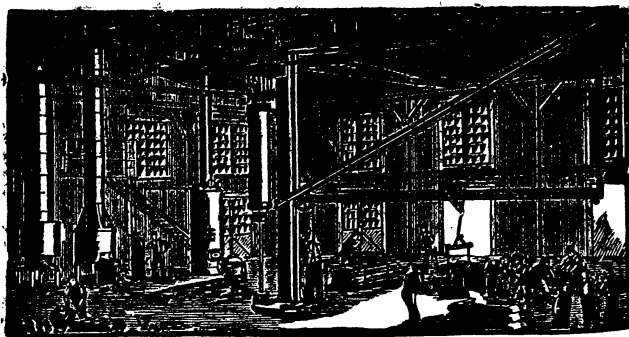
HAVE YOU EVER HEARD OF



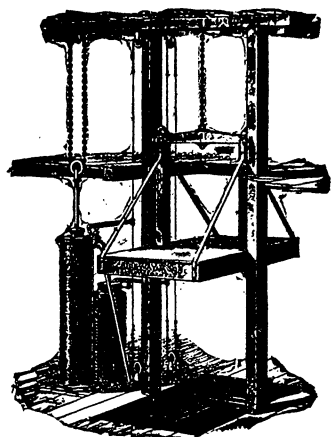
THE WONDERFUL FORSTNER AUGER BIT?

If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 56 cents. It will bore
Round, Oval and Square Holes, and cannot be equalled for fine carpentry, cabinet or pattern work. Discount
to dealers on application. FOR SALE BY ALL HARDWARE DEALERS

THE BRIDGEPORT GUN IMPLEMENT CO.,
313 and 315 Broadway, New York



5-ton Ridgway Crane in Foundry Diamond State Iron Co., Wilmington, Del.



Steam-Hydraulic Elevator.

is the Crane for all places.

Give full particulars and get circulars and prices.

**SAFE,
RAPID,
SURE**
— AND —
Not Costly.

The Crane that is perfection for the exacting requirements of a Foundry

CRAIG RIDGWAY & SON.,
Coatesville, Pa.

Ridgway Balanced Steam-Hydraulic Crane.

The Greatest Foundry Crane Known.

READ!

Have Dozens More Like It.

THE STIRLING COMPANY,
Water Tube Boilers.

Barberton, Ohio, April, 10, 1893.

MESSRS. CRAIG RIDGWAY & SON, Coatesville, Pa.

Gentlemen:—Some fifteen months ago my attention was called to the Crane you were building at Coatesville, and having had a large experience in the manufacture of the ordinary Hydraulic Cranes and the erection of Bessemer and Open Hearth Steel Plants, I concluded to give your Crane a thorough investigation, which I did. Six months ago we decided to build a foundry, and after looking over the various cranes in the market and satisfying ourselves we placed our order with you for one of your five-ton Steam-Hydraulic Cranes.

We have had this Crane in operation for the past two months and take pleasure in saying to you that it has more than filled all the requirements. The Crane is so simple in construction and design that it is operated by a small boy and is absolutely under control at all times. The uncovering of flasks, where it is necessary that the movement of the crane should be very slow and regular, is perfect. The coping of flasks, where it is necessary to lower the flasks carefully without jar, is done in the same manner. The cost of maintenance is nothing, and the cost of furnishing power is about the same. The small quantity of steam used is not missed on our boiler. Our fuel consumption is practically the same as it was before the Crane was put in and we are using it continually 12 hours per day. Our Secretary and General Manager was here on Friday of last week and spent five or six hours in the Foundry watching the manipulation and operation of the Crane, and as he is thoroughly familiar with all the cranes made in this country he expressed himself in this manner: "The money invested in the Ridgway Crane is one of the best investments the Stirling Company has ever made," and I concluded to write you and let you know how thoroughly well pleased and satisfied we are with our purchase.

Yours truly, THE STIRLING COMPANY,
H. E. Pell, Supt.

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN

BONNELLS NUBIAN

We Have It
You Want It.

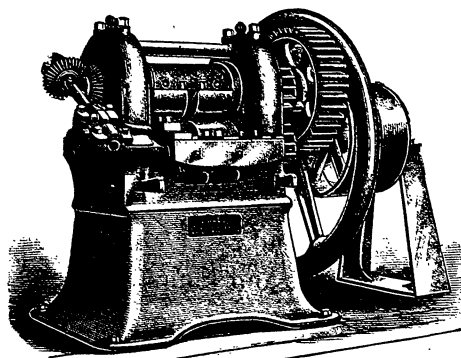
And for your money we will give you the best black on earth. Every gallon guaranteed. Far superior to asphaltum and just as cheap.

77 Warren St., New York, N. Y.
Hall & Carpenter, Philadelphia.
Taylor Goodrich, San Francisco.

THE NUBIAN IRON ENAMEL CO.,

33-35 Nubian Ave.,
CRAGIN, ILL.

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN



Taper Rolling Machine

For tapering round or flat stock.
For Elliptic Springs, Round Car
Spring Points, Files and Agricultural
Work.

MANUFACTURED BY

**THE COULTER & McKENZIE
MACHINE CO.,**

Bridgeport, - - Conn.

Also makers of Power Presses, Rivet
Machines and fine Automatic Wire
Working Tools.



Electric Motor Construction for Amateurs.

By C. D. PARKHURST.

Gives directions and working drawings for making an electric motor to run sewing machines, small lathes, etc., with rules for constructing the battery to furnish the electrical current, and much practical relative information.

A table indicating the difference in wire gauges is included.

Price, \$1.00.

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller

96-102 Reade St., New York.

**FOR NUMBERING AND LABELING
Boxes, Drawers and Shelves**
In Hardware Stores and Factories.

"Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade."

THE TABLET AND TICKET CO., Mfrs.,
87-89 Franklin St. Chicago.
99 Franklin St. New York.

**WILLSON'S
PAPER
LETTERS**

SELL THE BEST.




**THE "SURE GRIP"
Steel Tackle Block**

is taking the place of all other hoisting blocks.

Send for catalogue and discount

Fulton Iron & Engine Works,
28 Brush St., Detroit, Mich.
ESTABLISHED 1852.

Highest Efficiency.



**WESTON'S NEW
TRIPLEX
Chain Block**

far exceeds all predecessors. Send for Prof. Thurston's report of comparative tests of all chain pulley blocks.

The Yale & Towne Mfg. Co.
STAMFORD, CONN.
New York, 84-86 Chambers St.
Chicago, 152-154 Wabash Ave.
Philadelphia, 1120 Market St.
Boston, 224 Franklin St.

Alfred Box & Co.,
Front, Poplar and Canal Sts., Philadelphia.
SOLE MANUFACTURERS OF
BOX'S PAT. DOUBLE SCREW HOISTS.



25,000 supplied in the United States exclusive of foreign trade; a record that tells its own story; a record of solid, substantial growth; extensive new works necessary to keep up with orders in our specialties; ample room now to build the heaviest class of Traveling and Jib Cranes of all sizes, Overhead Railways, Trolleys, Special Hoisting Gear for home-made Cranes; also our Patent Radial Drills and Gang Drills, as used by bridge builders. Estimates furnished with photos. Correspondence solicited, or visit our works.

Moore Mfg. & Fdry. Co.,
Milwaukee, Wis., U. S. A.,
Manufacturers of
**Moore's Anti-Friction
Differential
Chain
Pulley
Block.**



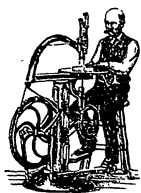
**A New Movement!
A Perpetual Compound Lever!
Powerful, Simple and Durable!
One Man Can Lift to the Full Capacity of the Block.
Self-Sustaining at Any Point.
The Block Always Hangs Plumb.**

Send for descriptive price-list, mentioning this paper.

Salem Foundry and Machine Shop
BUILDERS OF
ELEVATORS
SALEM, MASS.

LATHES.

ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.

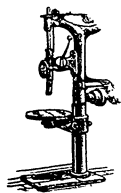
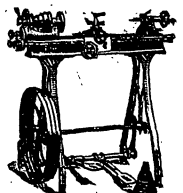


Patent Foot Power Machinery

SCROLL SAWS, CIRCULAR SAWS, MORTISERS, LATHES, &c

For Carpenters, Builders, Cabinet Makers and all Wood and Metal Workers. Catalogue free.

SENECA FALLS MFG. CO.,
255 Water St., Seneca Falls, N. Y.

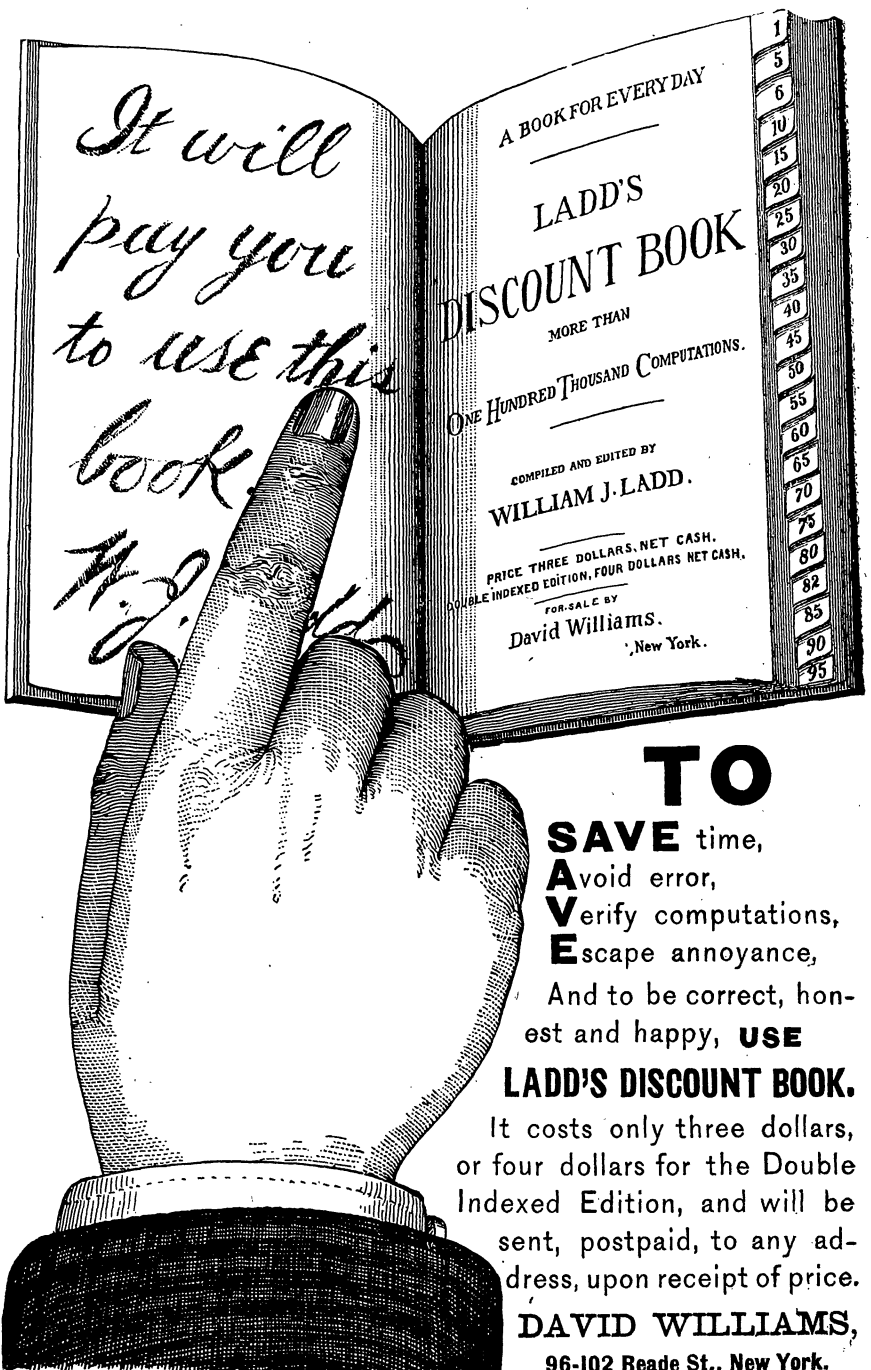


**UPRIGHT
FULL UNIVERSAL
AND RADIAL
BORING AND TURNING MILLS.**

BICKFORD DRILL AND TOOL CO.,
10 Lawrence St., Cincinnati, O.

DRILLS

Don't make Mistakes.



It will pay you to use this book.

LADD'S DISCOUNT BOOK
A BOOK FOR EVERY DAY
MORE THAN ONE HUNDRED THOUSAND COMPUTATIONS.
COMPILED AND EDITED BY
WILLIAM J. LADD.
PRICE THREE DOLLARS, NET CASH.
DOUBLE INDEXED EDITION, FOUR DOLLARS NET CASH.
FOR SALE BY
David Williams.
New York.

**TO
SAVE time,
Avoid error,
Verify computations,
Escape annoyance,
And to be correct, honest and happy, USE
LADD'S DISCOUNT BOOK.**

It costs only three dollars, or four dollars for the Double Indexed Edition, and will be sent, postpaid, to any address, upon receipt of price.

DAVID WILLIAMS,
96-102 Reade St., New York.

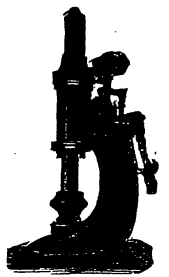


William Sellers & Co. Incorp.

PHILADELPHIA, PA.,

—MANUFACTURERS OF—

Improved Machine Tools for Working Iron and Steel,
High Speed Power Traveling and Swing Cranes,
Injectors, Locomotive Turn Tables, Shafting, &c., &c.
Testing Machines, under patents of A. H. Emery.
Prices, Descriptive Matter, &c., Furnished on Application.



**MORSE,
WILLIAMS
& CO.**

Morse Elevator Works.

MANUFACTURERS AND BUILDERS OF
ELECTRIC, HYDRAULIC, BELT and HAND
POWER PASSENGER and FREIGHT
ELEVATORS.

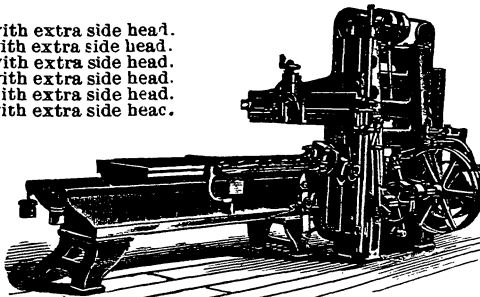
1105 Frankford Ave., Philadelphia. 108 Liberty St., New York.
1116 E. St., N. W., Washington, D.C. 33 Lincoln St., Boston.
425 Spruce St., Scranton, Pa. 82 Church St., New Haven
Omaha Building, Chicago, Ill.

= = OPEN-SIDE PLANERS. = =

READY FOR IMMEDIATE AND PROMPT DELIVERY.

Size C (30 in. x 30 in.), to plane 6 feet long.
Size C (30 in. x 30 in.), to plane 8 feet long with extra side head.
Size C (30 in. x 30 in.), to plane 12 feet long with extra side head.
Size D (36 in. x 36 in.), to plane 10 feet long with extra side head.
Size D (36 in. x 36 in.), to plane 12 feet long with extra side head.
Size F (48 in. x 48 in.), to plane 14 feet long with extra side head.
Size F (48 in. x 48 in.), to plane 16 feet long with extra side head.

**DETRICK & HARVEY
MACHINE CO.,**
MANUFACTURERS,
BALTIMORE, - - MD.



FAIRMOUNT MACHINE CO.,

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Sts., Philadelphia, Pa.
Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

Rope Transmission; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.

Lamberson's Hardware Price Books

COPYRIGHTED 1885.

LARGE SIZE FOR OFFICE USE.

6x9½ Inches, 500 Pages.

Bound in Leather, Price, \$8.00.

Pocket Edition.

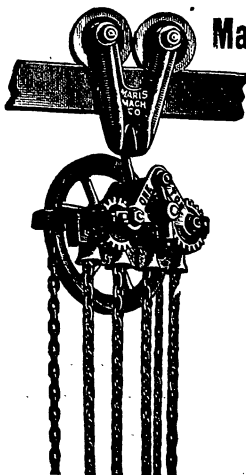
4x7 Inches, 250 Pages.

Bound in Leather, Price, \$4.00.

Sent postpaid on receipt of price by

DAVID WILLIAMS, Publisher & Bookseller,

96-102, Reade St., New York.



**Maris & Beekley,
PHILA., PA.**

MANUFACTURERS OF
CRANES,

Power Bridge
Cranes, Hand
Bridge Cranes,
Jib Cranes.

Portable Hoist
Holds load at any
point.

Overhead Track,
Trolleys,
Switches.

World's Fair, Machinery Hall, Section 26, Column O-30.

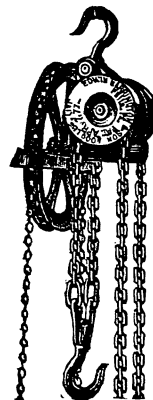


J. G. SPEIDEL,
807 & 809 CHERRY STREET,
READING, PA.,
Patentee and Manufacturer of the
celebrated

Economic Safety Hoist.

500 to 30,000 Lbs. Capacity.
Has been awarded the John Scott Medal and Premium by the Franklin Institute of the City of Philadelphia for Highest Efficiency, Simplicity and Durability.
One man can lift two to three times as fast as with any other self-holding chain hoist. It has two speeds, is built strong and durable, and guaranteed to give satisfaction.

TRAVELING AND SWING CRANES up to 30,000 lbs. capacity and 50 ft. span. Overhead Framway, with Trolleys, Switches, &c. Elevators and Special Hoisting Machinery. Illustrated Cat. and Prices on application.



ESTABLISHED 1867.

**E. Harrington, Son
& Co.,**

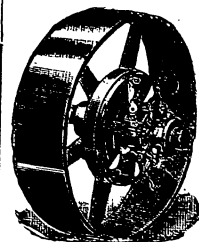
Works and office:

1508 Pennsylvania Ave.,
Philadelphia, Pa.

Lathes, Planers, Drill Presses, &c. Patent Double Chain Screw Hoists, Overhead Tramway-Switch, &c.

Gear Cutting a Specialty.

The Moore & White Co.,



Paper

Machinery,

Friction

Clutches, &c.

Clutch Pulley.

N. E. Cor. 15th AND LEHIGH AVE.,
PHILADELPHIA, PA.

Wanted, Contracts

For building mining, blast furnace, rolling mill and factory machinery, for making castings for cable and electric railroads, or any special line of castings. Address

MAHONING FOUNDRY AND MACHINE SHOP

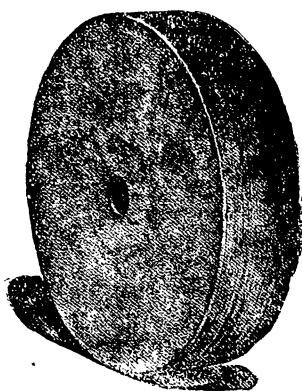
Danville Pennsylvania.

NORTON EMERY WHEEL CO. AT WORLD'S FAIR.

Machinery Hall Annex, Column E-53, Section 10.

NORTON EMERY WHEEL CO., **WORCESTER, MASS.**

**Solid Leather Wheels
FOR POLISHING.**



Will outwear any other wheel.
Saves the continual expense of
recovering. Pliable and elastic.
Waterproof and will not burst.

C. E. LE MASSENA & CO.,

776 Broad Street, NEWARK, N. J.

A POOR OIL STONE IS WORTHLESS.



PIKE'S

Lily White Washita is
Warranted to give
satisfaction.

THE PIKE MFG. CO., PIKE STATION, N. H.

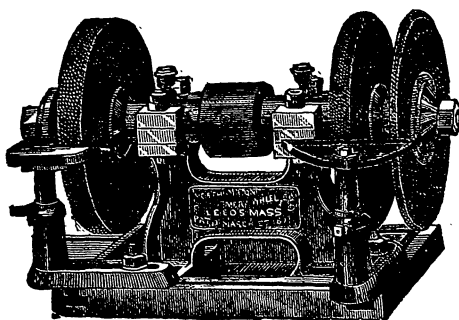
A POINTER



To **SAVE** you **FREIGHT** We keep in stock
everything in the grindstone line at our branch
yards, Chicago, Ill., Boston, Mass., and 283 Front
Street, New York.

Send for Catalogue D.

The Cleveland Stone Co.,
CLEVELAND, OHIO.



ESTABLISHED 1867. CAPITAL \$100,000

Northampton Emery Wheel Co.,
LEEDS, MASS.

And 20 South Canal St., Chicago,

MANUFACTURERS OF

EMERY WHEELS

—AND—

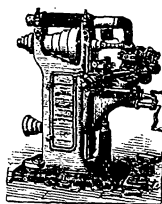
EMERY WHEEL MACHINERY

Of Best Quality.

Send for Catalogue. **FACTORY AT LEEDS, MASS**

Among Milling Machines

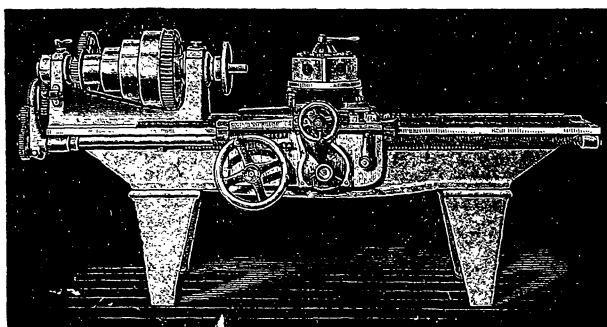
Ours is **CHEAPEST** to **OPERATE**



Because it takes less time to get ready for and finish a job than
on other machines. As to workmanship and price we invite in-
vestigation. Our catalogue will help you in selecting the best
for your money.

The Cincinnati Milling Machine Co.,

CINCINNATI, OHIO.



**TURRET
MACHINES
LATHES,
MILLING
MACHINES,
SPECIAL
MACHINERY,**

JOHN L. BOCERT, FLUSHING, N. Y.

A Treatise on Belts and Pulleys.

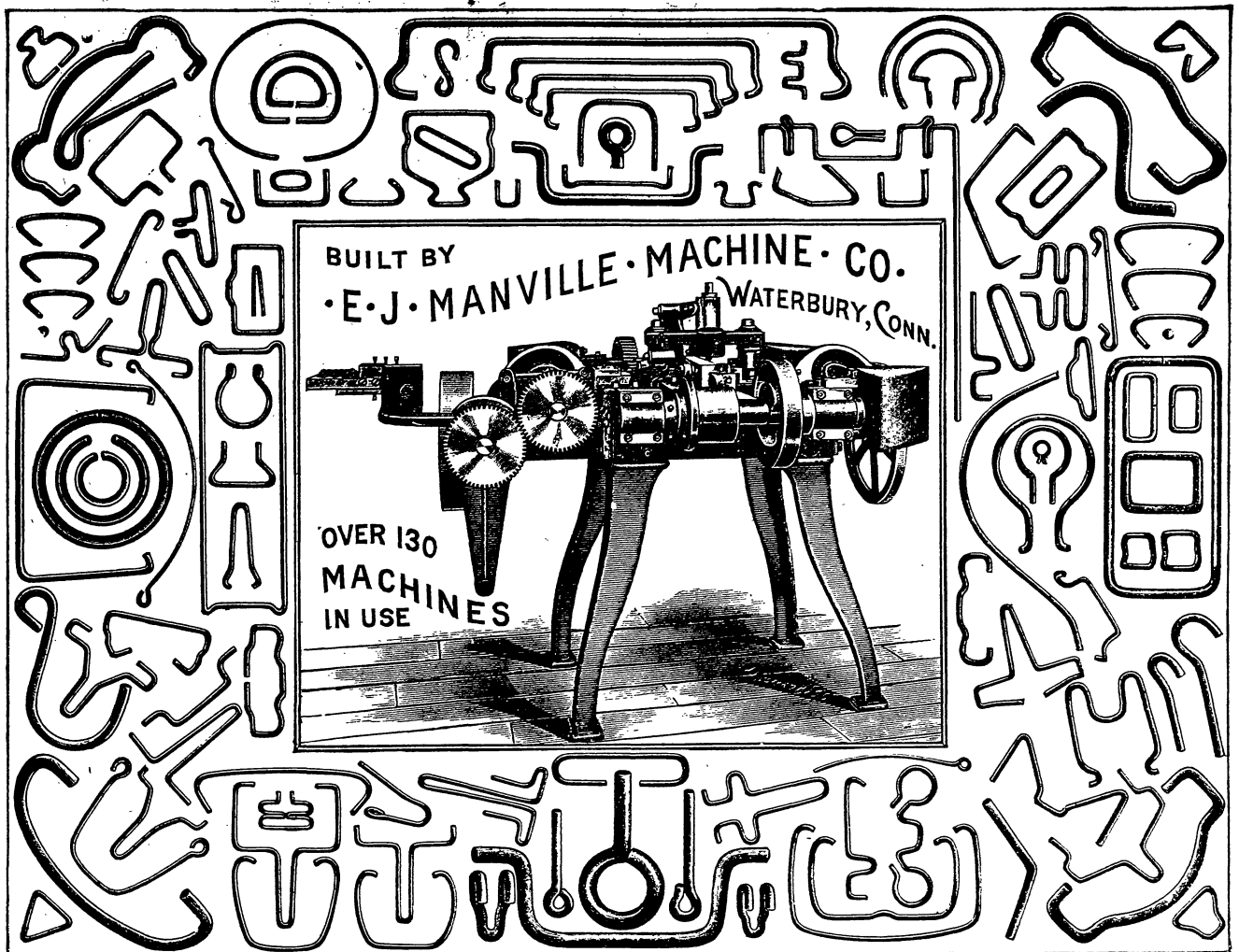
Embracing full explanations of Fundamental Principles; proper Dis-
position of Pulleys; Rules for determining widths of leather and vulcanized
rubber belts, and belts running over covered pulleys; Strength and Propor-
tions of Pulleys, Drums, &c. Together with the principles and necessary
rules for Rope Gearing and transmission of power by means of Metallic
Cables. By J. Howard Cromwell, Ph. B., author of a Treatise on Toothed
Gearing. 12mo, cloth. \$1.50.

SENT, POST-PAID, ON RECEIPT OF PRICE BY

DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street,

New York City



BUILT BY
E. J. MANVILLE MACHINE CO.
WATERBURY, CONN.

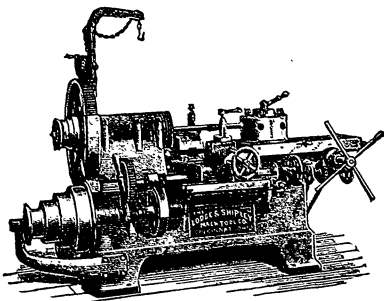
OVER 130
MACHINES
IN USE

TURRET LATHES.

The Turret on saddle is an adjustable box tool. Large and long spindle.

Bed, head stock, tail stock and side rails one and the same casting. Immense power.

Especially designed for duplicating work. Absolutely rigid.



The Lodge & Shipley
Machine Tool Co.

107-113 CULVERT STREET,

CINCINNATI, - - - OHIO

Mfrs. of machinery for rapid turning and boring.

DUNHAM NUT MACHINE CO.,

Unionville, Conn.,

Manufacturers of

AUTOMATIC COLD PRESS NUT MACHINES

FOR MAKING CHAMFERED AND TRIMMED NUTS.

Correspondence Solicited.

THE ROBERT W. HUNT & CO.

Bureau of Inspection, Tests and Consultation.

Rails, Splices and Cars. Analytical and Physical Laboratories. Examination of Iron and Steel Works and advice on Processes.

General Office: The Rookery, Chicago. Branch Offices: Hamilton Building, Pittsburgh; 28 Chestnut St., Philadelphia; 80 Broadway New York.



The Scattergood
Time Record and
Pay Roll Book.
(Pat. Oct. 13, 1891.)
Address for Circular to
HENRY W. SCATTERGOOD,
23 Richmond St., Phila., Pa.

RAILS

RAILS, Second Hand, Suitable for Relaying Cut to Lengths for Builders and Contractors. Old for Scrap. Dealers in all kinds of Railroad Scrap. Correspondence solicited.

SCHWARZENBERG BROS. & CO.,
187 to 189 Scranton Ave., - - - Cleveland, O.

J. POPPING'S

Patent

Machine & Tool Wks.



MANUFACTURERS OF
Solid Iron Shoulder Rabbit Planes, etc., etc.
and Hofstatter's Patent Hair Picking machine
N. E. Cor. 58 St. and 11th Ave. N. Y.

IT'S TO **Your Advantage** to correspond with us regarding emery wheels.

Grant Corundum Wheel Mfg. Co.
WORCESTER, MASS.

Great Bargains. Rails ^{FOR} Relaying

Must be Sold and Removed.

16 in. x 30 in. Horizontal Engine.
18 in. x 36 in. Horizontal Engine.
24 in. x 36 in. Horizontal Engine.
19½ in. x 48 in. Beam Engine, with Knowles Condenser.

Write us for what you want.

LOVEGROVE & CO.,

Third and Quarry Sts., Philadelphia, Pa.

SECOND-HAND MACHINERY.

One Belden 100-lb. Upright Power Hammer.
One American Tool Co.'s No. 2 Cabinet Turret Lathe, with slide rest; in fine order.
One Pratt & Whitney 36-in. Gap Chucking Lathe.
One Pratt & Whitney No. 3 Lincoln Milling Machine.
One Iron Planer, 52 in. wide, 44 in. high, 12 ft. long, with two heads.
One Springfield Universal Grinding Machine No. 3; swing 18½ in. over the ways and take 6 ft. between centers. Has been used but a very few times and is practically new.
Send for circular of Second-hand Machinery in stock.

HILL, CLARKE & CO.,

156 Oliver St., Boston, Mass.
12 and 14 South Canal St., Chicago, Ill.

WE ARE OFFERING BARGAINS

from the equipment of the United Electric Traction Company's Works of Marion, N. J., comprising:

Engine Lathes, from 14 in. to 48 in. swing.
Hand Lathes, from 10 in. to 20 in. swing.
Planers, from 24 in. x 5 ft. to 42 in. x 12 ft.
Shapers, from 15 in. to 20 in. stroke.
Drill Presses, all sizes up to 24 in. swing.
Milling Machines, Plain and Universal.
Brown & Sharpe Screw Machines.
1 Large Newton Slotting Machine.
1 Large Pond Mach. Tool Co.'s Radial Drill Press.
3 Gould & Eberhardt Automatic Gear Cutters, 36 in., 48 in. and 60 in.
1 Betts Machine Co. Large Horizontal Boring Mill.
2 Large Bliss Power Presses.
1 10 H.-P. Baxter Engine, with 15 H.-P. Boiler, complete. As good as new.
Also Tool Grinders, Die Sinkers, Tapping Machines, Bolt Cutters and Large Pattern and Blacksmith Shop Equipments.
These tools are in good order and of the very best makes in this country. They will be sold at remarkably low prices.
Call at our salesroom and inspect them, or write for complete descriptive circular and price-list.

THE GARVIN MACHINE CO.,

Laight and Canal Sts., New York.

BLAST FURNACE

Blowing Engine, made by West Point Foundry. Cyl. 36 in. x 8 ft. stroke, two flywheels 27 ft. diameter, blowing cylinder attached to main piston. Will sell cheap. This is a modern and complete engine. Address **G. W. SCHULTZ & CO.,** 308 Walnut St. Philadelphia.

WILL SELL my interest in U. S. Patent that has been accepted by the largest steel works and foundries in this country, also in Europe. Capital required, \$15,000. Address "STEEL WORKS," office of *The Iron Age*, 99-102 Reade St., N. Y.

400 tons 65 pound Steel, with Splices.
15 tons 50 pound Steel, 3½ in. high.
30 tons 40 pound Iron, no Splices.
7 tons 30 pound Iron, with Splices.
40 tons 25 pound Steel, with Splices.
4 tons 18 pound Iron, no Splices.
These Rails are all in first-rate condition for relaying, and will be sold very low.

THOS. P. CONARD,

206 Walnut Place, Philadelphia.

FOR SALE.

9 in. Potter & McDougall Steam Hammer.
500 ton Bushnell Knuckle Joint Press.
30 in. Inlet Sturtevant Blower and smaller.
5 tons ¾ in. and ¾ in. Hoisting Chain.
1000 ft. 1½ in. Rods and Turnbuckles.

MARVIN BRIGGS, 12 Broadway, N. Y.

FOR SALE.

ELECTRIC LIGHT PLANT (used 6 months).
1000 light Mather Dynamo.
125 H.-P. Dick & Church Compound Engine.
2 75 H.-P. Steel Boilers.

MARVIN BRIGGS, 12 Broadway, N. Y.

SECOND-HAND MACHINERY.

Boring Mill, 10 ft. 4 in. swing, 56 in. under cross rail, table 7 ft. 6 in. in diameter.

Boring Mill, 8 ft. 4 in. swing, 48 in. under cross rail, table 6 ft. 6 in. in diameter, two heads on cross rail.

76-in. Planer, 13 ft. long; heavy and powerful.

48-in. Car Wheel Borer.
Axle Lathe.

Write for photographs and further particulars.

Eastern Branch,

NILES TOOL WORKS CO.,

138 Liberty St., New York

MACHINERY, TOOLS, &c.

IN STOCK, LARGE LINE OF NEW AND SECOND-HAND engines, boilers and machinist's tools for sale or exchange. Below are some special bargains:
60 H.-P. Atlas Automatic engine.
20 H.-P. to 60 H.-P. plain slide valve horizontal engines.
2 H.-P. to 50 H.-P. vertical engines.
Power shears, 1 in. iron, 36 in. gap.
44 in. Pratt & Whitney cut-off machine.
20 milling machines (Bement's).
6 H.-P. and 10 H.-P. hoisting engines with boilers.
1, 2, 4 and 6 H.-P. yacht engines.
4 H.-P. and 7 H.-P. gas engines.
4 50 H.-P. portable boilers.
10 H.-P. to 100 H.-P. horizontal and vertical boilers.
20 screw-cutting lathes of different sizes.
Several rod-feed turning lathes.
6 in., 12 in. and 16 in. shapers.
24 in. and 36 in. planers.
44 in. radial drill, 1¼ National bolt cutter.
No. 3 Fowler press, 2 10 in. exhaust heads.
25 lbs. Bradley and 10 lbs. Hotchkiss Hammers.

FRANK TOOMEY,

131 N. Third St., Philadelphia, Pa.

SOME BARGAINS HERE.

1 Hendey Shaper, 15 in. stroke, imp. vise.
1 14 x 6 Screw Cutting Engine, Lathe: new.
4 H.-P. Comb. Engine and Boiler. Fine condition.
2½ Hendey Cutting-off Machine. New.
1 3-Spindle Garvin Drill Press, used 1 month.
100 H.-P. Woodbury Engine. 2d-hand Good order.
2 50 H.-P. Woodbury Boilers. Good order.
2 75 H.-P. Woodbury Boilers. Good order.
1 20 H.-P. Woodbury Engine. 2d-hand.
Also variety of Engines, Boiler Pumps, &c. And other machinery, new and second hand. Write for prices. **Machinists' Supply Company,** 39, 41 and 43 Central Ave., Rochester, N. Y.

WANTED.

To furnish reasonable estimates on specialties in light metal work.
CLARK & COWLES, Plainville, Conn., Manufacturers of Clock Trimmings, Rivets, Springs, &c.

CORLISS

and other Automatic Engines, Slide Valve Engines, Boilers, Steam Pumps, Tanks, etc., etc.

Corliss Engines, 10 x 20; 16 x 42; 23 x 36; 26 x 48; 28 x 60; 30 x 60; 30 x 72 and other sizes. Also Porter Allen, 14 x 30; 11 x 16; Slide Valve, Back Valve, Cut-off 18 x 36; Slide Valve, 16 x 48; 16 x 36; 14 x 24; 13 x 24; 10 x 24; a large assortment of Steam Pumps, one 1000 gal. Steam Fire Pump, Bogardus Mill, Simpson Crusher, Brennan Crusher, Jagersoll Rock Drill, 30 in. Burr Stone Mill, 8 and 9 ft. Fan Blowers, Platform Scales, 4 side Wood Planer and Matcher, &c., &c.

Also 4 Rendering Tanks, Round Tanks, Square Tanks, Jacket Tanks. Send for catalogue.

G. M. CLAPP,

74 Cortlandt St., New York.

!!! FOR SALE !!!

BAKER BLOWERS, Nos. 1, 4½, 5, 6 and 7.
ROOT BLOWERS, Nos. 1, 2, 3, 4, 5, 6 and 7.
Sturtevant Blowers, Nos. 4, 5, 6, &c.
1 Corliss Band Wheel, 12 ft. x 24 in., in halves.
A Variety of Machinery, Such as Boilers, Engines, Pumps, Crushers, &c., very cheap.
Do you want to buy or sell Machinery? If so, write **C. R. BIGELOW, Machinery Expert,** 45 Dey St., New York City.

16 INCH FLAT MILL.

For sale cheap. Made by Garrison & Co., Pittsburgh; complete and modern; 3-roll high, flywheel 20 tons, 5 sets Housings, pinions, rolls, bedplates, &c., in perfect condition. Address

G. W. SCHULTZ & CO.,
308 Walnut St., PHILADELPHIA.

4 3 H.-P. Vertical High Pressure Engines.
2 5 H.-P.
3 6 x 10 Horizontal Engines.
2 8 x 12 "
2 10 x 14 "
8 5 H.-P. Gas Engines.
5 10 H.-P. "
1 8 x 12 D. C. Hoisting Engine.
3 Rock Crushers.

H. H. MANSFIELD,

126 Liberty St., New York.

For Sale, Cheap LOCOMOTIVES AND CARS.

Standard and narrow gauge boarding, box, coal, flat, refrigerator and passenger Cars. Also large quantities of relaying and scrap rails, car wheels and scrap, pig iron, muck bars, &c.

G. H. SIBELL & CO.,
62 and 64 Michigan Ave., Chicago, Ill.

Trustee's Sale of Machine Shop Equipment

Lathes, 52 in. swing by 41 ft., 54 in. swing by 22 ft. 30 in. swing by 22 ft.
Planers, 54 in. wide by 20 ft., 48 in. wide by 20 ft., 36 in. wide by 13 ft.
Drills, 36 in. upright, 5 ft. post, 20 in. post.
Engines, 5 new and 7 second-hand, from 100 H.-P down.

Circular on application
W. A. BOLE, Trustee,
Liberty Ave., cor. 25th St., Pittsburgh, Pa.

FOR SALE OR HIRE.

Engines with Cylinders 26 in. x 48 in. and smaller.
Portable, Tubular and Vertical Boilers of all sizes.
13 2-yard 3-ft. gauge all around Dump Cars.
7 Narrow Gauge and 2 Standard Gauge Locomotives.
1 Large Worthington Duplex and other Pressure Pumps. New and Second hand.
Hoisting Engines and Grinding Pans.
Rail, Sheet and Clipping Shears.

THOMAS CARLIN'S SONS,
Allegheny, Pa.

FOR SALE.

1 Engine Lathe, 24 in. swing x 25 ft. bed. Modern. First-class condition.
1 Lincoln Miller. Good order.
1 3 in. Cutting-off Machine. Nearly new.
1 No. 1, No. 2 and No. 6 Root's Blower.
Prices very reasonable.

COOKE & CO.,

163 and 165 Washington St., New York

FOR SALE.

NICKEL PLATING OUTFIT, consisting of Zucker & Levett's Dynamo, Hot-Water Tank, Large Baths, etc. All order.

AUTOMATIC WIRE STRAIGHTENER AND CUTTER, Jno. Adt & Son make, cuts Wire 0 to 3/4 in. and up to 8 ft. long. Used 3 months.

CLEMENT'S AUTOMATIC WOOD LATHE, 32 in. swing, Back Knife. Good as new.

J. J. McCabe,

68 Cortland Street, New York.

WANTED.

Foundry Contracts to be completed before September 1st. Capacity of works, 9 tons per day. Can make close prices and prompt shipment.

FRANK C. PATTEN CO.,
Sycamore, Ill.

FOR SALE CHEAP.

50 tons of 56-pound, 150 tons 60-pound and 200 tons of 50-pound second-hand Steel Rails, suitable for relaying. For prices, &c., address

J. H. RICHARDSON & CO.,
Pittsburgh, Pa.

BICYCLE MANUFACTURING PLANT FOR SALE.

Located in a prominent Western city and adapted to the manufacture of bicycles of any grade. Capital required, \$75,000 to \$100,000. Good orders for season of 1894 assured. For particulars apply to

THE R. M. CO.,
P. O. Box 31, Cincinnati, O.

Second-Hand Rails**FOR SALE.**

In lots to suit, and ready for delivery.

2000 tons 60 lb. Steel T Rails.
800 tons 54 lb. Steel T Rails.
400 tons 50 lb. Steel T Rails.
550 tons 50 lb. Iron T Rails.
600 tons 45 lb. Iron T Rails.
2000 tons 40 lb. Steel T Rails.
600 tons 30 lb. Iron T Rails.
150 tons 40 lb. Steel T Rails.
200 tons 25 lb. Steel T Rails.
1700 tons Johnson Girder Rails, 38, 48, 52 and 66 lb. Rails.

All selected and in excellent condition for relaying and only slightly worn. For prices and particulars apply to

JOSEPH JEWKES,
Railway Equipment, Pittsburgh, Pa.

A Successful Rolling Mill

Is desirous of undertaking the manufacture of horse and mule shoes. Correspondence is solicited with parties owning or controlling a good horse shoe machine. Party preferred who is willing to take an interest in the business.

Address "C. B. & Q."
office of The Iron Age, 96-102 Reade St., N. Y.

WANTED.**Twelve inch Train of Rolls.**

Wanted at once 12 in. Train of Rolls new or second-hand.

JANSON IRON COMPANY,
Columbia, Pa.

BOILERS AND SHEARS FOR SALE.

Two Tubular Boilers, 48 in. diameter, 16 ft. long, with fronts, grate bars and fittings complete. Also one Double Deck Tubular Boiler, without settings. All guaranteed for 90 lbs steam. 1 large lever Plate Shear, cutting to 3/4 in. plate. 1 Rotary Trimming Shear, will cut 3-16 in. Apply to
MARSHALL BROS. & CO.,
1156 Beach St., Philadelphia, Pa.

WANTED.

Two or three 60 to 100 lbs. Bradley Cushioned Helve Hammers. Must be in good condition. Cheap for cash. Address
DANIEL L. HEISKELL, Wheeling, W. Va.

FOR SALE.**LOCOMOTIVE STYLE BOILERS,**

all sizes; fitted to suit customers.

100 H.-P. Corliss Engine.

5 ton Ice Plant.

New and second-hand Pumps, and a general line of Machinery.

Plants fitted complete.

CHESTER BERTOLETTE & CO.,

Norristown, Pa.

FOR SALE.**STEEL STREET RAILS, Side and Center Bearing.**

Fitted to relay. Apply to

DAN'L W. RICHARDS & Co.,
92 Mangin St., New York.

FOR SALE.

2 Double Deck Boilers about 40 H.-P. each, cheap. Hoisting Engine. Cylinder Boilers for Stacks, 30, 40 and 42 in. diameter. Round and Square Iron Tanks. Book Binding Machinery. Smoke Stacks, light and heavy, all sizes. Large lot Cast and Wrought Scrap Iron on hand. Also Dealers in Metals.

BUSSENIUS & CUNLIFFE,
12th and Washington Ave., Philadelphia.

FOR SALE.**CRANK and GEARED SHAPERS.**

Write us for Bargains.

J. STEPTOE & CO., Cincinnati, O.

FOR SALE.

One No. 5 Gates Rock Breaker with revolving screen, engine, boiler, winding drum, wire rope, dump cars, rails, turn table, steam drill, picks, shovels, sledges, striking hammers, steel drills, crow bars, etc., etc.

One No. 6 Gates Rock Breaker with revolving screen, engine, boiler, endless cable drums, wire rope, dump cars, rails, turn tables, picks, shovels, sledges, striking hammers, steel drills, crow bars, etc., etc.

FLORENCE SILICA WORKS,
Cumberland, Md.

HARDWARE BUSINESS FOR SALE.

The Hardware, Housefurnishing and Carriage Goods Business established over 65 years' and carried on by the late Charles P. Strong, in New Brunswick, N. J., together with the store, property and good will, is offered for sale to close his estate. A fine opportunity for a stock company. For particulars and terms apply to

WILLIAM DUNHAM, JR.,
WILLIAM P. VOORHEES, Executors of C. P. Strong deceased, New Brunswick, N. J.

FOR SALE.

Complete stock of Hardware, Stoves, Tinware, Paints, Oils, &c., in a thriving city of 3500 in Northeastern Indiana. Invoice about \$6500. Also in an adjoining town, similar stock of about \$8500. Rare opportunity for a cash customer. Business established in 1852.

F. E. DAVENPORT, Assignee.
Auburn, Ind.

Collections?

ATTENTION! Merchants and Manufacturers.—We collect your past due accounts. Do not let them remain too long upon your books. Our terms just and fair.

THE HARDWARE BOARD OF TRADE, Ltd.
4 and 6 Warren street, New York.
JAS. H. GOLDRY, Treas.

STEEL TUBES.

A patented process, of great value, seeks financial aid to complete plant and provide a sufficient working capital. A very liberal arrangement can now be made "OWNER," Box No. 1036, New York Post Office.

OFFICE OF LIGHT-HOUSE INSPECTOR. Third District, Tompkinsville, N. Y., September 11, 1893.—Proposals will be received at this office until 12 o'clock M., on Saturday, the 30th day of September, 1893, for furnishing to the Light-House Establishment Iron Buoys and Appendages, and Mooring Chain, required during the fiscal year ending June 30, 1894. The articles to be furnished embrace nun, can, bell, whistling, wooden spar, and ice buoys, shackles, mooring chain, ballast balls, iron and stone sinkers, etc., all of which are enumerated in the specifications attached to the form of bid, which may be obtained on application to this office. Contracts will be awarded on each item separately, and bidders will be required to deliver the articles on or before the dates named in the specifications. The right is reserved to reject any or all bids, to strike out any item or items in the specifications, to waive any defects, and to require the delivery of a greater quantity, not to exceed one-half of any item, than the quantity stated in the specifications, at any time during the fiscal year. A clause to that effect will be inserted in the contract. Proposals will be subject to the above conditions. W. S. SCHULTZ, Captain, U. S. N., Light-House Inspector, Third District.

OFFICE OF THE LIGHT-HOUSE ENGINEER. Seventh District, New Orleans, La., September 23, 1893.—Sealed proposals will be received at this office until 2 o'clock P. M. of Tuesday, the 24th day of October, 1893, for furnishing materials and labor of all kinds necessary for the completion and delivery of the metal-work for the beacons for Tampa Bay, Florida. Plans, specifications, forms of proposal, and other information may be obtained on application to this office. The right is reserved to reject any or all bids and to waive any defects. JAMES B. QUINN, Major of Engineers, U. S. A., Light-House Engineer, Seventh District.

TO LET

In the "IRON AGE" Building,

FOR OFFICES,

96-102 Reade Street.

FIRST LOFT, 50 FEET FRONT.

THIRD LOFTS, 100 FEET FRONT.

To Let for Light Manufacturing Business,

Fourth and Fifth Lofts, 50 Feet Front.

Excellent Light, Elevator, Power and Steam Heat.

APPLY TO

WM. C. WALKER'S SONS,
299 1/2 Broadway.

WANTED TO BUY.

Cold Rolled Scrap Steel, 4 ft. long, 3 to 5 in. wide, No. 16 or 18 gauge, or oblong pieces, 12 x 16.

PULLMAN SASH BALANCE CO.,
Rochester, N. Y.

EUGENE BISSELL, Auctioneer.

E. BISSELL, SON & CO.,

Successors to
HAYDOCK & BISSELL,
WHOLESALE

HARDWARE AUCTIONEERS,

12 Murray St. and 15 Park Place, N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

C. F. RICE,

206 So. Green St., - - CHICAGO.

Largest wholesale house in America for Mirrors of all kinds, Pictures, Mouldings, Frames, Brackets, Easels, Screens and kindred goods. Large illustrated catalogue sent to Dealers upon application.

Safe Gold Loans.

Portland, Oregon,

The Title Guarantee & Trust Co.

has special facilities for placing money at 6 to 8 per cent. on improved city property with insured titles, secured by first mortgage, principal and interest repayable in GOLD.

W. M. LADD, Pres. BUELL LAMBERSON, Vice-Pres.
J. THORBURN ROSS, Sec.

Reference: National Park Bank, New York.

For Sale.—A Bargain.

A nice clean stock of Shelf and Heavy Hardware, Stoves and Tinware, invoicing about \$10,000. Centrally located in a thriving city of 15,000 population in Eastern Nebraska. Business long established, and trade all that could be desired. Rent reasonable. A rare opportunity. Satisfactory reasons for selling. Address "NEBR." Box 928, office of *The Iron Age*, 96-102 Reade St., N. Y.

FOR SALE.

Hardware Stock and Building in a county seat town in Nebraska. Location good. Business profitable. No dead stock. Good reasons for selling. Amount required \$5500, one-half cash. Address

"W. S.," P. O. Box 672, New York.

CHARLES WEILAND.

I make a special business of buying and selling Job Lots of

HARDWARE AND CUTLERY.

Tools and Second Quality Files a Specialty.
Send for Catalogue.

149 Chambers St., New York.

IF YOU WANT A NIAGARA DYNAMO OR MOTOR

or if you are a dealer and want an Agency send for our Catalogue and Price-List.

LOVELL MFG. CO., LTD., ERIE, PA.

BLOWING ENGINE FOR SALE

Vertical pattern, with balanced steam slide valve gear, steam cylinder 14 in. diameter, air cylinder 40 in. diameter, stroke 24 in. 1 to 100 strokes per minute; engine new.

JAMES LEFFEL & CO., Springfield, Ohio.

KEEP BOOKS

by WEST'S New Original-ENTRY LEDGER.

Make the same entry but once. A Ledger in place of a full set of books. Convenient forms for all entries. Easily applied, simple, saves time. West's Self-Proving Balance locates every error. Send 3 2-cent Stamps for illustrated 16-page pamphlet.

WOLCOTT & WEST, Syracuse, N. Y.

HELP WANTED.

Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

COMPETENT FOREMAN, in wrought iron and wire factory; must be experienced in all its branches; give references and salary expected. Address "WIRE AND IRON WORKER," office of *The Iron Age*, Bank of Commerce Building, St. Louis.

SALESMEN WANTED; special line shears and scissors as side line to retail trade; pays 20 per cent. commission. "W. M. B.," Box 928, office of *The Iron Age*, 96-102 Reade St., N. Y.

A COMPETENT Foreman Moulder, well up in casting rolls and general mill and machinery castings, columns, &c., ingot moulds; none need apply unless having held a foreman's position (about ten moulders employed); send copy of testimonials, with age and wages expected, to "MOULDS," No. 928, office of *The Iron Age*, 96-102 Reade St., New York.

SALESMAN drumming the Hardware and machinists' supply houses to handle a salable line of goods on commission. DEVERALL PERF. MFG. CO., 38 Bridge St., Brooklyn.

MANUFACTURERS' AGENTS and Salesmen on commission to sell Juvenile bicycles, velocipedes, tricycles, iron wagons, goat sulkies, toy barrows, doll cabs. THE GENDRON IRON WHEEL CO., Toledo, Ohio.

SALESMAN thoroughly acquainted with retail hardware and tinware trade to represent a manufacturer in each of the following states; Iowa, Michigan, Minnesota, Indiana, Wisconsin, New York, Illinois, Missouri, Pennsylvania, Ohio, Nebraska, Kansas, Massachusetts; must furnish first-class references. "MANUFACTURER," office of *The Iron Age*, 59 Dearborn St., Chicago.

SITUATIONS WANTED.

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

BY FIRE BRICK LAYER; is thoroughly posted on mill work and all kinds of furnace building and repairing; best of references from former employers. Address "BRICK-LAYER," Lock Box 42, Station B, Pittsburgh, Pa.

BY A GUIDE AND BAND ROLLER, with some experience in rolling wire rods. Address "H.," office of *The Iron Age*, 220 So. 4th St., Philadelphia.

TO ENGINEERS AND CONTRACTORS. By Draftsman with seven years' experience, technical education; used to hydraulic plant and general construction; first-class references. Address "X.," No. 928, office of *The Iron Age*, 96-102 Reade St., New York.

STEEL CASTINGS.—A man of experience desires a position as foreman of a steel casting foundry. Address "A. A.," Box 1592, Philadelphia, Pa.

MANUFACTURERS.—Gentleman with office on lower Broadway, New York, wishes to act as representative to manufacturing concern. Address "A. AGENT," Box 928, office of *The Iron Age*, 96-102 Reade St., New York.

BY A CHEMIST of highest ability and large experience in the manufacture of steels, blast furnace and modern foundry practice; capable of burdening furnaces for Bessemer and foundry irons, and computing mixtures for all kinds of castings. Address "BESSEMER," office of *The Iron Age*, 96-102 Reade street, New York.

BY MECHANICAL ENGINEER with practical experience in steel works and rolling mills; experienced in erecting and repairing all kinds of machinery, furnaces, buildings, etc., and in designing the same; can furnish best references. Address "ENGINEER," office of *The Iron Age*, 96-102 Reade St., New York.

I AM EXPERIENCED in manufacturing, familiar with every detail of office, good draftsman and have well developed general business ideas of implement, hardware and machinery trades; I seek a location in the East with able men who want a clean cut, honest, industrious young man. Address MR. JNO. T. PREYFIT, office of *The Iron Age*, Room 509, Hamilton Building, Pittsburgh, Pa.

A YOUNG MARRIED MAN, 26 years of age, in the hardware, stove and tinware business, wholesale and retail, wishes to better his position; is also conversant with the details of bookkeeping; best of references. Address JOSEPH BIRKBECK, Post Office Box 157, Free-land, Pa.

RESPONSIBLE POSITION by a graduated chemist and engineer in steel works or furnace plants; reference President Midland Blast Furnace Co. Address C. W. Kolbe, Midland, Mo.

A THOROUGH, wide awake and competent man would like situation as puddle boss or assistant superintendent; have position at present, but would like to hear from any parties in want of a man for either position; can give first-class recommendation. Address "S. S. H.," No. 980, office of *The Iron Age*, 96-102 Reade St., New York.

A FOREMAN of Iron Foundry; have had large experience in one of the largest malleable iron foundries. Address "L. F.," Box 928, office of *The Iron Age*, 96-102 Reade St., New York.

BY A MECHANICAL ENGINEER, first-class draftsman, graduate from the German Polytechnic High School as Government machine engineer, with two years' practical experience; secured highest award for competitive work in the construction of modern derricks. Address D. KOPS, 500 Broadway, New York City.

BY A GUIDE MILL ROLLER; have had 8 years' experience in guide mill rolling on all sorts of small iron and steel; am strictly temperate, and can give good references as to ability and character. Address "GUIDE MILL," office of *The Iron Age*, 96-102 Reade St., N. Y.

SHEET MILL SUPERINTENDENT; qualified man seeks position; has had English and American experience; understands the strict economy of manufacture, iron or steel, common or smooth finish roofing sheets, black plates for tinning, also heavy plates; familiar with all details of operation or construction. Address "SHEETS," office of *The Iron Age*, 96-102 Reade St., New York.

A YOUNG MAN with experience, and familiar with the trade in Virginia and West Virginia, would like to represent some good manufacturer of explosives, beginning January 1. Address "EXPLOSIVE," office of *The Iron Age*, 96-102 Reade St., New York.

SITUATION wanted by traveling salesman having extensive acquaintance with jobbers of hardware and with carriage manufacturers in 23 states. Thoroughly familiar with all kinds of carriage material, and some line of such goods preferred, but would handle another line. Reference past employers. Address "CARRIAGE HARDWARE," office of *The Iron Age*, 96-102 Reade St., New York.

A WELL KNOWN and successful Blast Furnace Superintendent or Founder will be open for engagement after Oct. 1st, 1893. Is thoroughly competent as constructor or in the management. Practical, theoretical and in touch with latest improvements in blast Furnace practice. First-class record and references. Address "BLAST FURNACE, No. 921," office of *The Iron Age*, 96-102 Reade St., New York.

BY A MIDDLE AGED married man; has had many years' experience as bookkeeper, special accountant, keeping cost sheets, etc., of the various articles manufactured in machine shop, boiler shop, foundry and wire mill work; thoroughly understands business, clerically, in all details. Address "CLERICAL," office of *The Iron Age*, 59 Dearborn St., Chicago.

MECHANICAL ENGINEER and superintendent (36), now engaged as such with manufacturing company, desires a change; experienced designer and manager of men; 16 years' practice in railroad, rolling mill, gas and water works machinery; best of references. Address "COLUMBIA," office of *The Iron Age*, 59 Dearborn St., Chicago.

STENOGRAPHER and bookkeeper, five years' experience in coal and iron business, thoroughly acquainted with all branches of office work and voucher system, desires permanent employment of like character in good locality after October 1st; best references furnished; age 22. Address "STENO," office of *The Iron Age*, 96-102 Reade St., New York.

BY A MEMBER of the A. S. M. E. expert in shop management and economical production of machinery, as superintendent or manager; well posted on dynamical, hydraulic and mechanical engineering and inspection of materials. Address "W. O. W.," office of *The Iron Age*, 96-102 Reade St., New York.

THE LATEST BOOKS.

Portable Electricity: Being a Treatise on the Application, Methods of Construction and Management of Portable Secondary Batteries. By J. T. NIBLETT. Fully illustrated. 8vo, cloth. \$1.00

The Progress of Marine Engineering, from the Time of Watt to the Present Day. By THOS. MAIN. 67 illustrations. 12mo, cloth. \$3.00

Plumbing, Drainage, Water Supply and Hot Water Fitting. By JOHN SKEATON. 222 illustrations. 8vo, cloth. \$3.00
Contents: Introduction; drainage; danger from city wells; external plumbing; internal plumbing and fittings; sanitary plumbing; water service, and tapping of mains under pressure; water supply; ornamental leadwork; heating; hot-water work; index.

Electrical Distribution. By M. H. KILGOUR, H. SWAN and C. H. W. BIGGS. Its Theory and Practice. 174 illustrations. 12mo, cloth. \$4.00

The Plumber and Sanitary Houses. By S. S. HELLIER. 5th edition. Royal 8vo. \$5.00

Plate Girder Construction. By ISAMI HIROI, C. E. Revised Edition. 16mo, cloth. New York, 1893 (Van Nostrand's Science Series No 95). 50c.

How to Use Electrical Measurement Apparatus. By CHAS. P. FREY. A Manual of Practical Information Relating to Electrical Testing. Illustrated. 8vo, paper. 50c.

Lectures on Sanitary Law. By A. WYNTER BLYTH. 8vo, cloth. \$2.50

Directory of American Gas Companies. By C. E. BROWNE. Gas Statistics. 7th year. 8vo, cloth. \$5.00

The Dynamo, How Made and How Used. By S. R. BOTTONE. Eighth edition, with additional matter and illustrations. 12mo, cloth. \$1.00

Warm Air Furnace Estimate Book. By DANIEL P. HOLMES. Cloth. 50c

The Electric Transmission of Intelligence. By PROF. E. J. HOUSTON. And other Advanced Primers of Electricity. 88 illustrations. 12mo, cloth. \$1.00

Varnishes, Lacquers, Printing Inks and Sealing Waxes; Their Raw Materials and Their Manufacture. By W. T. BRANST, to which is added the art of varnishing and lacquering, including the preparation of putties and of stains for wood, ivory, bone, horn and leather. 336 pages with 39 engravings. 12mo, cloth. \$3.00

Twenty Years' Practical Experience of Natural Asphalt and Mineral Bitumen. By W. H. DELANO. Illustrated. 12mo, parchment. 50c

Knots, Splices, Hitches, Bends and Lashings. By F. R. BRAINARD. Illustrated and described. 76 pages, 16mo, cloth. \$1.00

Sent, postpaid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street, New York.

IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

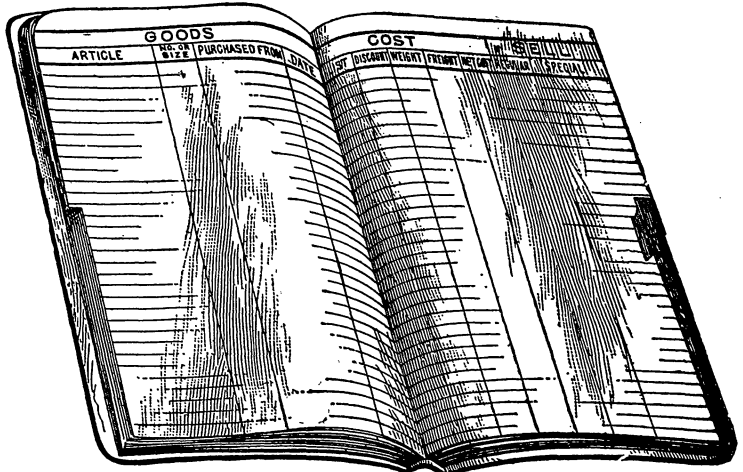
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

| | | | | | |
|-----------------------------|---|---|---|---|--------|
| A, 200 pages, | - | - | - | - | \$1.00 |
| A F, 200 pages with flap, | - | - | - | - | 1.25 |
| A 2, 400 pages, | - | - | - | - | 1.50 |
| A F 2, 400 pages with flap, | - | - | - | - | 1.75 |



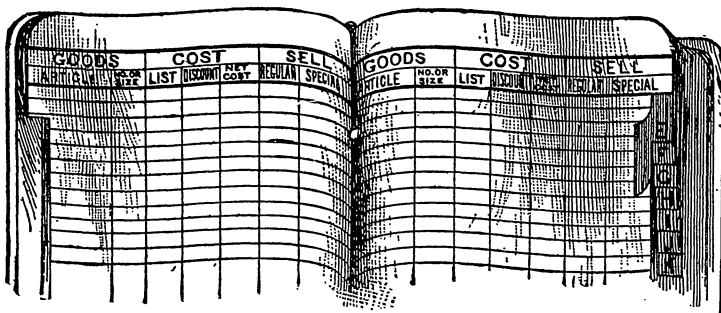
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

| | | | | | |
|-----------------------------|---|---|---|---|--------|
| B, 200 pages | - | - | - | - | \$1.00 |
| B F, 200 pages with flap, | - | - | - | - | 1.25 |
| B 2, 400 pages, | - | - | - | - | 1.50 |
| B F 2, 400 pages with flap, | - | - | - | - | 1.75 |



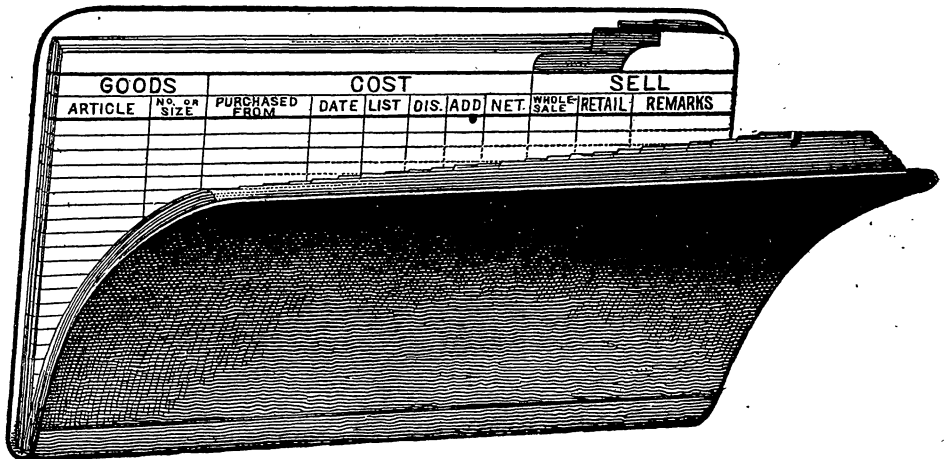
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

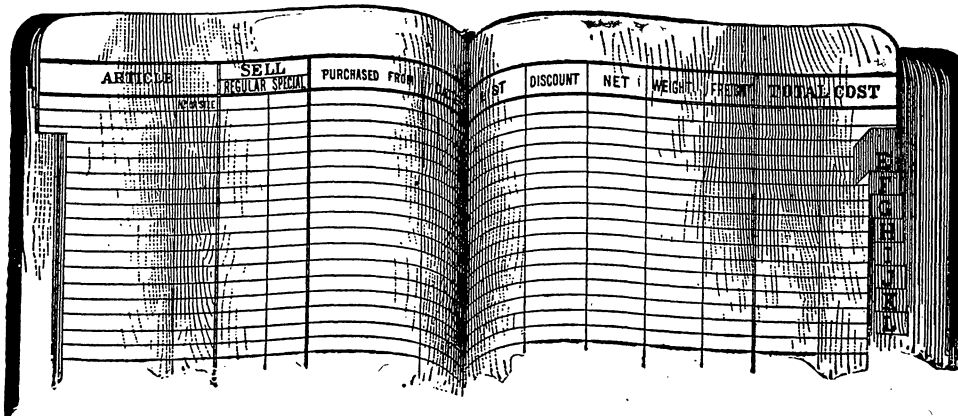
Size, 4½ x 7½ in.; grain seal leather.

FOUR EDITIONS:

| | | |
|-----------------------------|---|--------|
| C, 200 pages, | - | \$1.00 |
| C F, 200 pages with flap, | - | 1.25 |
| C 2, 400 pages, | - | 1.50 |
| C F 2, 400 pages with flap, | - | 1.75 |



Hardware Price Book C.



Hardware Price Book D.

Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This ar-

angement is adapted to the requirements of the trade in this direction.

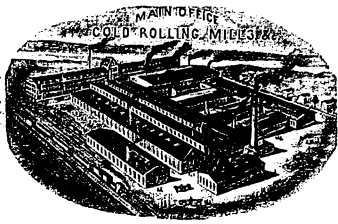
| | | | |
|----------------|----------------------------|---|--------|
| FOUR EDITIONS. | D, 200 pages, | - | \$2.00 |
| | D F, 200 pages, with flap, | - | 2.50 |

Size 5¼ x 8 in.; grain seal leather.

| | | |
|------------------------------|---|--------|
| D 2, 400 pages, | - | \$3.00 |
| D F 2, 400 pages, with flap, | - | 3.50 |

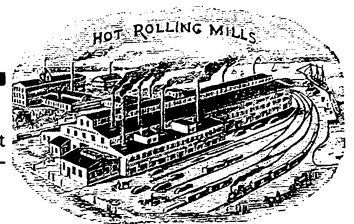
Sent, post-paid, on receipt of price by DAVID WILLIAMS, Publisher, 96-102 Reade St., New York.

Oiler Department, THE WILMOT & HOBBS MFG. CO., Store, 20 Murray St., New York.

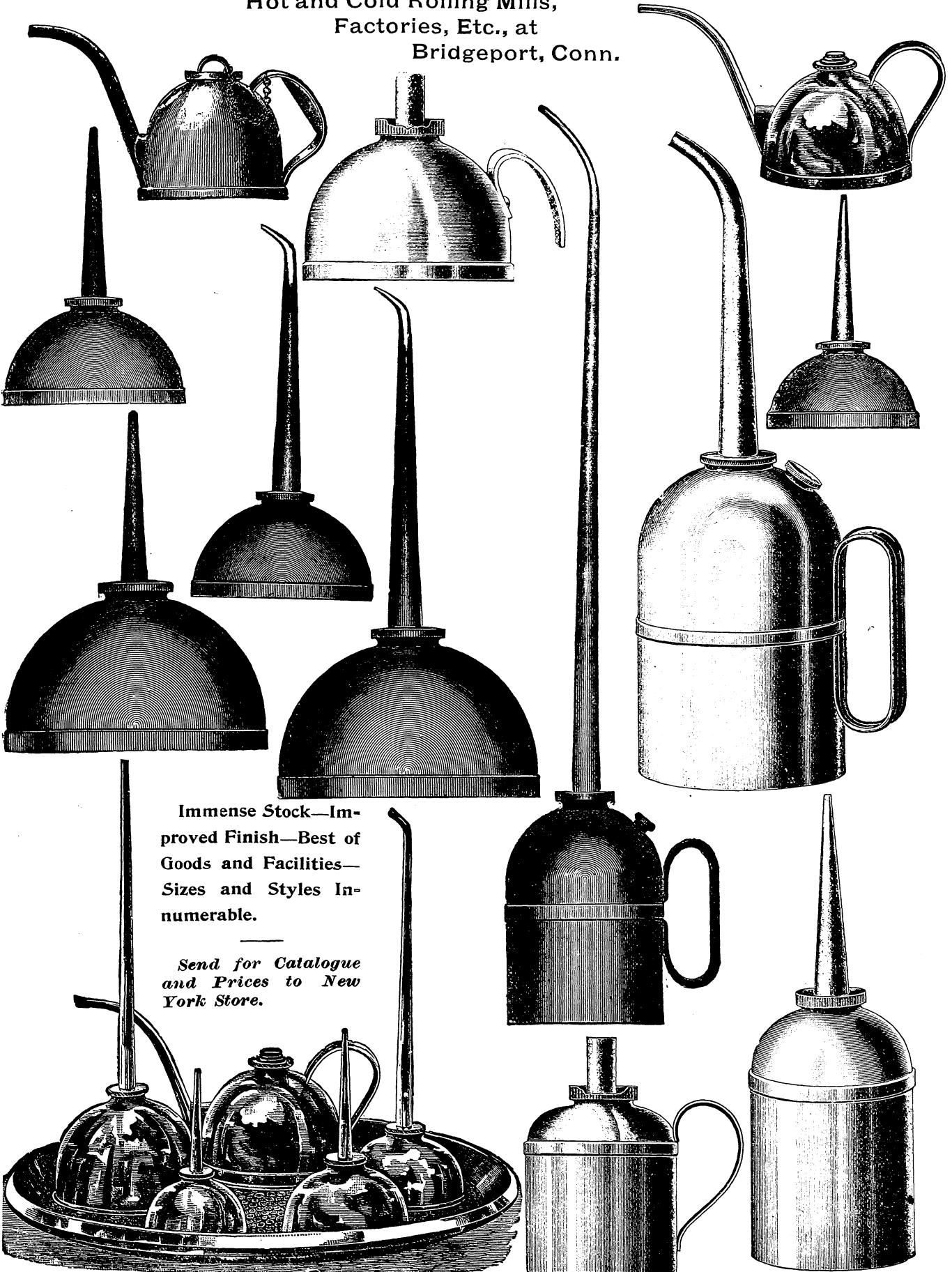


Sole Manufacturers of
COPPERIZED C. R. "SWEDON" STEEL ANTI-RUST OILERS.
Trade Marks Registered. Patents applied for.

They are HEAVILY COPPER-PLATED INSIDE to prevent rusting and the oil from becoming gritty. The outside perfectly resembles BURNISHED COPPER.



Hot and Cold Rolling Mills,
Factories, Etc., at
Bridgeport, Conn.



Immense Stock—Im-
proved Finish—Best of
Goods and Facilities—
Sizes and Styles In-
numerable.

Send for Catalogue
and Prices to New
York Store.

THE STEEL AND IRON IMPROVEMENT CO.,

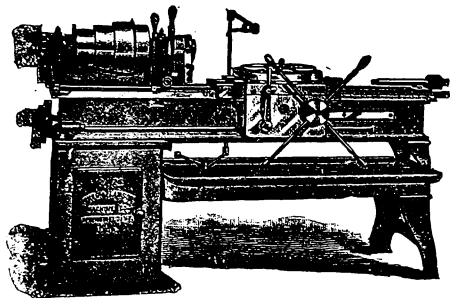
Controlling the Adams-Blair Process and other Steel and Iron Patents.

High Grade Open Hearth Steel produced by the Adams-Blair Process at less than the Cost of BESSEMER Steel.

91 and 98 Fifth Ave., Pittsburgh, Pa.

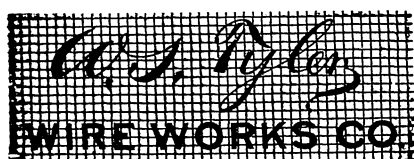
EASTERN OFFICE: 412 Drexel Building, Philadelphia, Pa.

2 BY 24 FLAT TURRET LATHE.



SEND FOR CATALOGUE FOR '92.

Jones & Lamson Machine Co.,
SPRINGFIELD, VERMONT, U. S. A.



MANUFACTURERS OF

"The Tyler"
PAINTED, POWER LOOM

Fly Screen Cloth

Standard Mesh and Wire with Double Selvedge.
W. S. TYLER, Pres. PROCTOR PATTERSON, Sec. & Treas.
CLEVELAND, OHIO.

ANALYTICAL AND ASSAY **LABORATORIES**
—OF—

DR. GIDEON E. MOORE

221 PEARL ST., (Corner Platt St.) NEW YORK.

Assays of Ores, Metals and Metallurgical Products of every description.

Analysis of Water, Ores, Minerals, Metals, Fuel, and Natural and Industrial Products generally.

PRINTED PRICE-LIST ON APPLICATION.

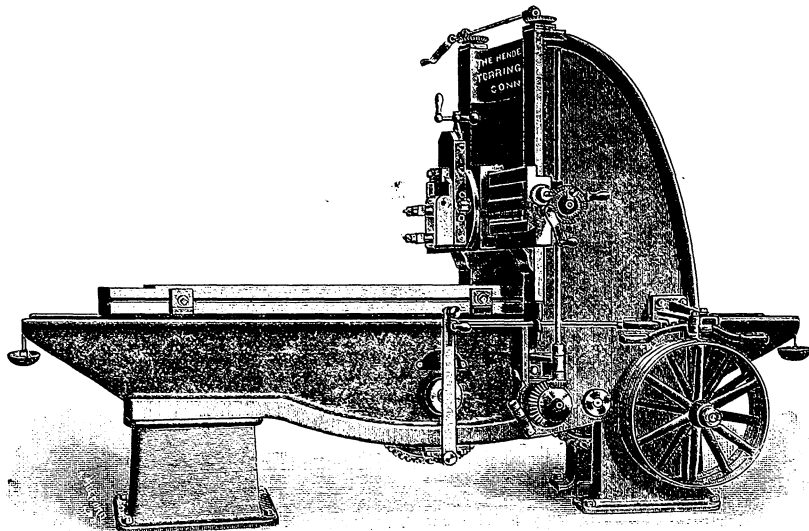
ALUMINUM.

The Pittsburgh Reduction Co.,

116 Water St., Pittsburgh, Pa.,

Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

ALUMINUM SHEET, WIRE,
AND CASTINGS.



Iron Planers at Reduced Prices.

We have on hand a few new planers of this pattern, and in order to dispose of them quickly, we would make a good reduction in price of same. The sizes are 16 inch, 22 inch, 24 inch and 27 inch. If you are in need of a good planer write us for prices on these.

The Hendey Machine Co., Torrington, Conn.

DO YOU NEED

SPECIAL MACHINERY.

CORRESPOND WITH

THE NEWARK MACHINE TOOL WORKS,

NEWARK, N. J.

OUR beautiful bicycle catalogue may be had for the asking and it may help you decide what wheel you wish to handle next year. The records made by the Stearns speak for themselves.

E. C. STEARNS & CO., Syracuse, N. Y.



KEEP THE BALL ROLLING

Live Dealers are doing this by keeping a well-assorted stock of

B. & B. Oil & Gas Stoves.

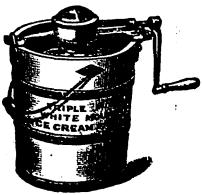
You can do the same. Get our Catalogue and discounts and follow directions.

Prices to suit the Times.

The shingle which we here display Has stood right well the test, And bears a name known everywhere—The "Brightest and Best."

The Glazier Stove Co., Mfrs., CHELSEA, MICH.

W. W. MONTAGUE & CO., San Francisco, Cal., Agents for the Pacific Coast.

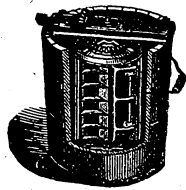


The standard by which the merits of a Freezer are gauged is, how near it comes to being as perfect as the

WHITE MOUNTAIN ICE CREAM FREEZER.

It always has been, and is still, the best. Try them.

Manufactured by The White Mountain Freezer Co., Nashua, N. H.



THE OLD RELIABLE STANDARD FREEZER

has the reputation of being the BEST ICE CREAM FREEZER ever introduced. STRENGTH, DURABILITY, NEATNESS AND EFFICIENCY are prominent points in the manufacture. Full Size Can, CEDAR TUB, Detachable Hinged Crossbar, Self-adjusting Vibratory Scraper, etc.

Write for Illustrated Circular, Price-List and Discounts of STANDARD, GOOD LUCK, MODEL and MACHINE Freezers.

CHAS. W. PACKER, Mfr.,

20 North Fourth Street, Philadelphia

THE "New" Keystone Beater,

FOR WHIPPING

AND

BEATING

EGGS.

MIXING

BATTERS, DRINKS, SAUCES, ICINGS, POWDERS, ETC.

CREAMING

MELLOW FRUITS, BANANAS, PEACHES, BERRIES, BUTTER & SUGAR.

No. 20 for Family Use.

JAR ENTIRELY COVERED.

No more Spattering.

CAN BE USED ANYWHERE.

Standing or Sitting.

ALWAYS READY FOR USE.

Nothing to be fixed.

SIMPLY PERFECT.

No. 20.—Jar holds 1 quart level full. Complete Machine securely packed in one single package. 1/2 dozen packed in case.

MANUFACTURED ONLY BY

NORTH BROS. MFG. CO.,

Manufacturers of Hardware Specialties for Household use American St. and Lehigh Ave., Philadelphia, Pa., U. S. A.



Are You Here To Make Money?

—O—

If so, the prices we are making on

Oil Heaters and Gas Stoves

will interest you.

We are making prices to suit your pocketbook.

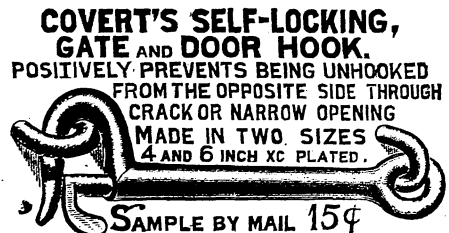
Our new 80-page Catalogue is now ready. You can glean many points of interest from it. Ask for one.

Discounts to Dealers.



BARGAINS IN BICYCLES.

Write for latest list and catalogue free. **Sylphs, Overlands and Rudges** of our own manufacture on favorable terms to the trade; **Western Wheel Works' Cycles** of which we are largest Western jobbers at Bed-Rock prices. Positively 20 to 80% saved on many styles. The low prices and high quality of our goods will surprise you. Don't miss it. Write now. Cycles sold on easy payments. **ROUSE, HAZARD & CO., 146 G St., Peoria, Ill.** Manufacturers, oldest and largest jobbers in U. S.



Call for Our Banner Bolt Snap:

This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substance and freezing, and is lower in price.

Made in all sizes; Round, Loop and Open Eye. We are headquarters and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,

FARMER, N. Y., U. S. A.



CROWN and GIANT BRAIDED

Sash Cord, Bell Cord, Mason's Lines, Clothes Lines.

Picture Wire, Bright Wire Goods.

OSSAWAN MILLS, Norwich, Conn.

Hardware Dealers Can Profitably Sell Bicycles.

There is a large trade in Bicycles in all parts of the country and much of that trade naturally belongs to dealers in hardware. Good bicycles meet with a ready sale and pay a fair percentage of profit.

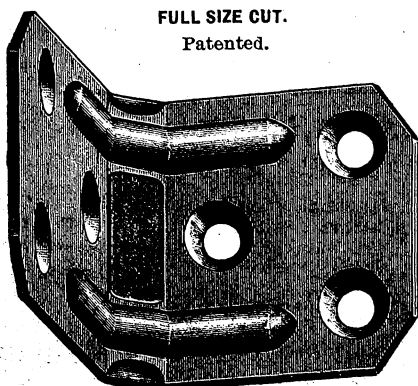
COLUMBIAS

Are the representative high grade machines in America. A Columbia is the easiest machine to sell to the best trade because it is unquestionably the standard wheel of the world.

We want enterprising agents of good standing and solicit correspondence.

Pope Mfg. Co.,

221 Columbus Ave., Boston, Mass.



FULL SIZE CUT. Patented.

CORRUGATED STEEL CORNER BRACES.

A SUPERIOR ARTICLE.

Plain, Japanned or Bronzed.

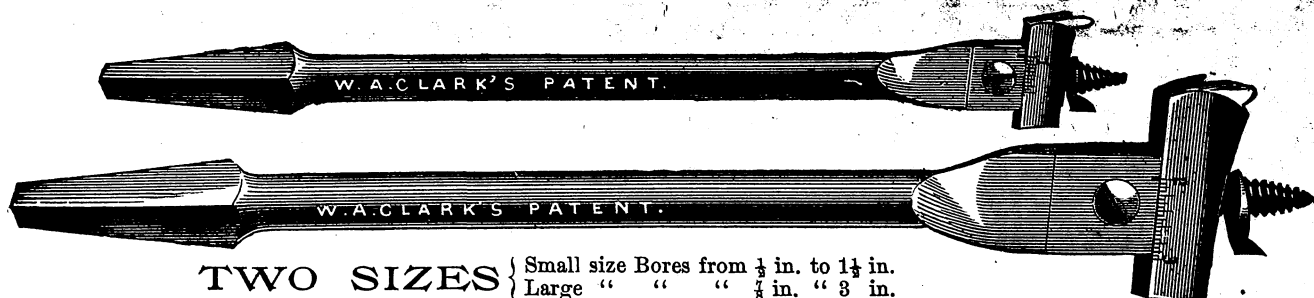
—SAMPLES AND PRICES ON APPLICATION.—

THE STANLEY WORKS,

New Britain, Conn.

79 Chambers St., N. Y.

THE WM. A. CLARK PATENT EXPANSIVE BIT.



TWO SIZES } Small size Bores from $\frac{1}{2}$ in. to $1\frac{1}{2}$ in.
 Large " " " $\frac{3}{4}$ in. " 3 in.

SPECIAL CUTTERS: No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

Quality guaranteed. For sale by all Hardware Dealers.

Manufactured by **R. H. BROWN & CO.,** New Haven Conn.

*You take no risk on the quality
 We make only the best!*



**Sand
 Papers**
 IN
 Reams and Roll

Filnt Paper
 Garnet Paper
 Emery Paper
 Emery Cloth

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & CO.

730 MARKET STREET, PHILADELPHIA;
 97 BECKMAN STREET, NEW YORK.
 143 MILK STREET, BOSTON;
 182 LAKE STREET, CHICAGO.

THE GEM SOLID STEEL MINCER



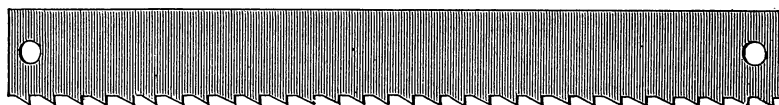
Single
 and
 Double Blades.

Handle and Blade Formed in one piece.
 Always Clean. Indestructible.
 No Rivets to Wear Loose.
 No Wooden Handle to Shrink, Swell, Loosen,
 Split, or Fill with Rancid Grease.

MANUFACTURED BY

PALMER HARDWARE MFG. CO.

TROY, N. Y.



ANY HARDWARE DEALER

in any place can have all the trade in

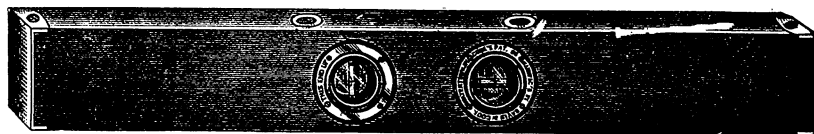
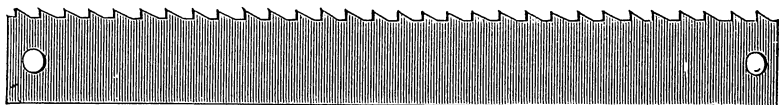
BUTCHER SAW BLADES

if he will take the trouble to show the Star Blades to the Butchers and permit them to try their quality. There is not a single place where these Blades have been used that they have not taken and held the market. They can be sold for **10 Cents** each, and that is less than the cost of filing a common saw. They are so hard that one will cut three or four times as long as the saws now in use without filing. As these Saws are not to be filed, and as one only lasts a few months before getting dull, a great many of them are wanted. They are listed on the 50th page of our new Catalogue, which we will send on demand.

MILLERS FALLS CO., 93 Reade St., New York.

STAR BUTCHER ★ SAW BLADES.

| Length. | Width. | Gauge. | Teeth to Inch. | Per Dozen |
|---------------|-------------------|--------|----------------|-----------|
| 14 and 16 in. | $\frac{5}{8}$ in. | 24 | $9\frac{1}{2}$ | \$1.08 |
| 18 " 20 " | $\frac{5}{8}$ " | 24 | $9\frac{1}{2}$ | 1.20 |
| 22 " 24 " | $\frac{5}{8}$ " | 24 | $9\frac{1}{2}$ | 1.32 |



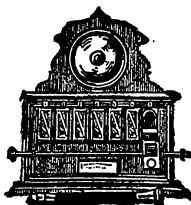
**COOK'S
 PATENT
 LEVEL.**

Made in Wood and Iron. Every Level Fully Guaranteed.

Inquire at your nearest hardware store for them. If not in stock, send to

TAKE NO
 OTHER.

DAVIS & COOK,
 WATERTOWN, N. Y.



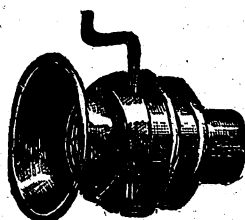
W. R. OSTRANDER & CO.,

204 FULTON STREET, NEW YORK,

Manufacturers of

SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC
 MECHANICAL AND PNEUMATIC ANNUNCIATORS
 AND BELLS.

Complete outfits of Speaking Tubes, Whistles
 Electric, Mechanical and Pneumatic Bells. A full line
 always in stock. Send for new catalogue. Factory,
 DeKalb ave. near Knickerbocker Brooklyn, N. Y.



CABINET LOCKS

OF EVERY KIND.

DRAWER LOCKS,

CUPBOARD LOCKS,

WARDROBE LOCKS,

CHEST LOCKS

DESK LOCKS.

A complete line of more than 1000 list numbers exclusive of our old
and complete line of

YALE CABINET LOCKS.

THE YALE & TOWNE M'F'G CO.,

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.

THE DEALER who sells what

THE PEOPLE ask for.

MAKES FRIENDS and MONEY, and
SAVES TIME and TROUBLE.

The people ask for

LePage's Liquid Glue,

And the people are right.

It is the strongest and best glue made. It has been
imitated, but never equalled. Be sure to get what you
order and ACCEPT NO SUBSTITUTES.

Our name is on every label

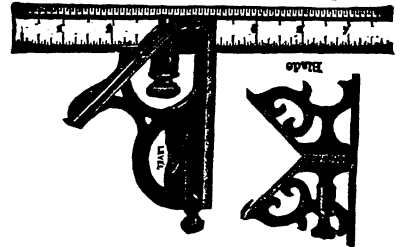
RUSSIA CEMENT CO.,

GLOUCESTER, MASS.

New York Office, 95 Reade and 113 Chambers Streets.

Pacific Coast Office, 23 Davis Street, San Francisco, Cal.

CHAPLIN TRY AND CENTRE SQUARE.



Also a full line of

MACHINISTS' FINE TOOLS.

If you haven't our 1893 catalog send us a postal card.

STANDARD TOOL CO.,

ATHOL, MASS., U. S. A.

ATHOL MACHINE CO., Selling Agents.

NONPAREIL Ratchet Wrenches.



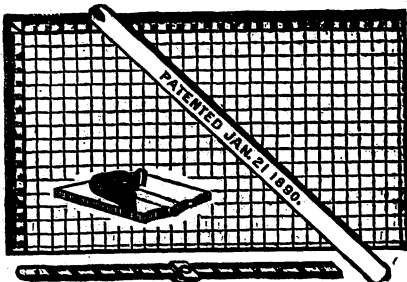
Made of best forged Tool Steel; are
easily and readily adjusted and con-
trolled. Can be made reversible in-
stantly without removing from their
work by throwing over the lever in
slot of the handle.

The Set of Combination Tools No. 1
includes the wrench, two sockets, one
for screw-driver, bit or reamer shank,
with wood handle, and one socket

for drill shank and feed nut. The
jaws on this wrench open from 3-16
to 1 1/4 inches.

Send for Illustrated Circular
and Price-list of various sizes

The Keystone Mfg. Co.
312 Terrace, Buffalo, N. Y.



The Canton Glass Board.

Cuts any Fraction of an Inch by Eighths.

Unequaled for accuracy and quick work in cut-
ting square or at any angle. Saves breakages, &c.

—ALSO—

IMPROVED TRAMMEL RULE for Cutting Circles

From 8 inches up to 48 inches, Segments,
Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.

American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.

Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

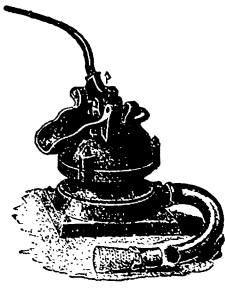
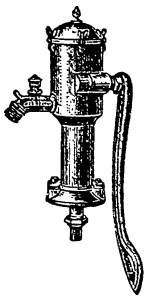
A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 209.

Fig. 381.

Fig. 145.



or wherever it is desired to raise a large quantity of water by
hand power.

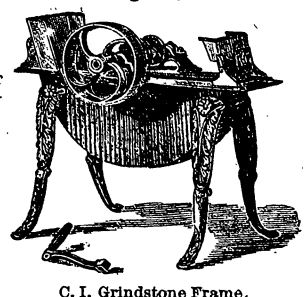
The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.
Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

THE DEMING CO.
FACTORY
SALEM O.S.A.

MANUFACTURERS OF
ARTESIAN WELL CYLINDERS
HYDRAULIC RAMS
VERTICAL STEAM PUMPING
ENGINES.

N.Y. OFFICE
72 JOHN ST.
NEWTON & HUBBELL
GEN'L WESTERN AGTS
55 & 57 N. CLINTON ST.
CHICAGO, ILL.

HAND & POWER
PUMPS
WELL
SUPPLIES
& C.

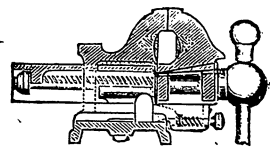
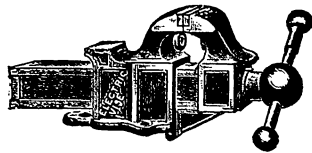
VISE.

Patented Dec. 27, 1892.

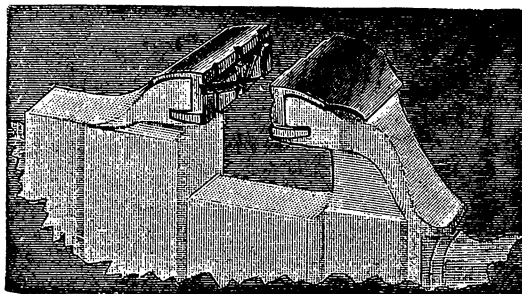
IT HAS QUALITIES THAT ARE
UNDISPUTED.

Rapid, Active, Prompt

One movement in and out, one
turn of the hand and the
work is secured.



The Capital Machine Tool Co., AUBURN, N. Y.



BINGHAM

PATENT VISE JAW CAP

Will Fit any Kind of Vise.

For protecting finished work. Will
hold finished rods of any shape without
injury.

3 1/2 inch..... per pair, 40 cents.
4 " " " " 50 "
4 1/2 " " " " 60 "

PRENTISS VISE CO.

44 Barclay St., New York.

F.E. MYERS & BRO.

WORLD'S FAIR
PUMPS
ASHLAND, O.

THE LARGEST
PUMP & TOOL
WORKS
EXCLUSIVELY
IN THE
UNITED STATES

ASHLAND PUMP AND HAY TOOL WORKS.

IRON INSTEAD OF WOOD.

GALVANIZED IRON TUBING and CURB,

FOR CHAIN PUMPS,

(Kegler's Patent)

Are Giving Universal Satisfaction,

BECAUSE:

They do not rust and
accumulate filth—always
clean. Extreme lightness
is combined with strength
and durability. No freezing.
No waste of water by
reason of enlarged reser-
voir at top of tubing. No
annoying wheel at bottom.
Easy to handle.

Tubing weighs less than
1/4 lb. per ft., is connected
by couplings and can be
attached to any make of
curb.



Send for Catalogue.

Bellevue Pump Co., Bellevue, Iowa

ACME CUTTING TOOLS.

Made in all Sizes.



SOLID STEEL ACME PLIER
AND WIRE CUTTER.

Made with cutters of best steel.

strong as solid steel.



ACME CUTTING NIPPER.

Jaws of choicest Tool Steel, dove-
tailed into the head, making it as

HIGGANUM HARDWARE CO., HIGGANUM, CONN.

New York Office, 18 CHIN STREET.

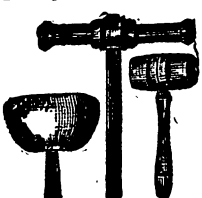
JOHN LOYD,

Machine Knives, Shear Blades,
Presses and Dies.

Nos. 558 to 562 Water Street, New York.

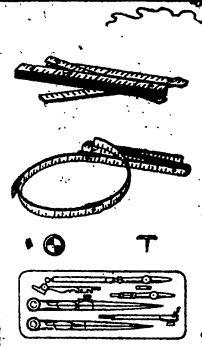
The New York Safety Dumb Waiter
"The Manhattan Dumb Waiter."
The Improved Humphrey Hand Elevator.
Made specially to be sold by Hardware Stores. Thou-
sands in use. Catalogues on application.

THE STORM MANUFACTURING CO.
NEWARK, NEW JERSEY.
Formerly of Poughkeepsie, New York.



N. Y. Mallet and Handle
WORKS,
MANUFACTURERS OF
MALLETS.
Also Cotton and Bale
Hooks.

Patented Feb. 13, 1877, a new
combination of Hooks.
456 E. HOUSTON ST.,
New York City.



KEUFFEL & ESSER CO. *NEW YORK.*
BRANCH: CHICAGO.
FACTORIES: HOBOKEN, N.J.

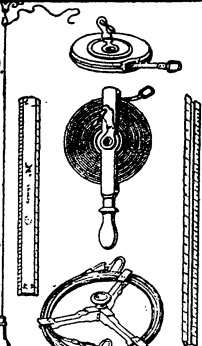
MANUFACTURERS OF EXCELSIOR MEASURING TAPES.
SUPERIOR QUALITY, LATEST IMPROVED. GREATEST VARIETY.
STEEL • METALLIC • LINEN • POCKET TAPES.
EXCELSIOR BAND CHAINS FOR SURVEYORS, LAND CHAINS, &c.

K & E CO FOLDING POCKET RULES.

NO WARPING, NO SHRINKING, NO ILLEGIBLE JOINTS, NO BULK.
2 3 4 5 6 8 FOOT, ALSO WITH PATENT SPRINGS.

FLAT & TRIANGULAR BOXWOOD SCALES, BEST MADE.
PLUMB BOBS, THUMB TACKS, DRAWING INSTRUMENTS.

PRICE LISTS & QUOTATIONS PROMPTLY SENT.



HIGHEST GRADE PLATED WARE MADE.

THE MAJESTIC.

Design Patented August 29th, 1893.

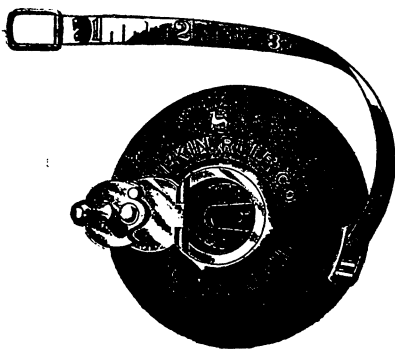


All our goods Sectional Plated on parts most exposed to wear.

Branch Offices:

19 Murray St.,
New York.
110 & 112 Wabash
Ave., Chicago.
722 Chestnut St.,
Philadelphia.
133 Charles St.,
Baltimore.
120 Sutter St.,
San Francisco.

The Rogers and Hamilton Co., Factories and Main Office, WATERBURY, CONN.
FOR SALE BY ALL THE LEADING JOBBERS.



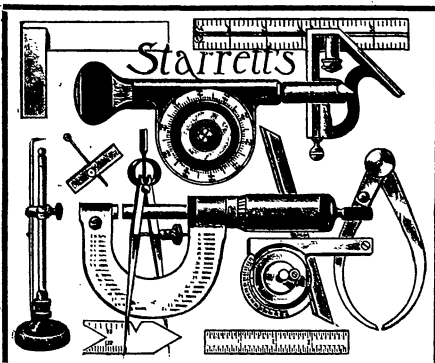
"RELIABLE" Steel Measuring Tapes.

Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval. We carry a complete stock of our goods at our New York Office, 20 Murray St.

LUFKIN RULE CO., Saginaw, Mich.

THE BEST TOOLS PAY.

To make the Best—pays me.
To use the Best—pays the mechanic.
To sell the Best—will pay



YOU.

FOR CATALOGUE AND PRICES OF
THE BEST TOOLS WRITE TO

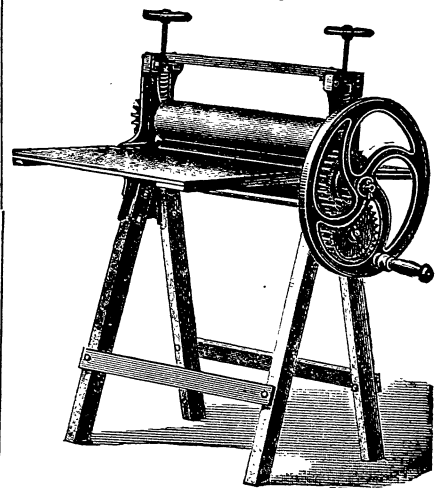
L. S. Starrett,
Athol, Mass., U.S.A.

LONDON AGENTS:
Chas. Churchill & Co., Ltd., 21 Cross Street,
Finsbury, E. C.

The Family Mangle.

WARRANTED TO DO
Better Work than Hand-work.

SAVES all the fuel,
two-thirds the work.
Keeps the linen whiter.
We Guarantee Every Machine.



Send for descriptive circular to
S. C. Johnson, Racine, Wis.

Agents Wanted.

CARPENTERS' & MACHINISTS'

IRON BENCH LEVEL

WITH DOUBLE PLUMB.

No. 5. 6 in.



MANUFACTURED BY

C. F. RICHARDSON & SON,

ATHOL, MASS.

THE QUEEN ANNE SCREEN CO.,
Burlington, Vt.,
MANUFACTURERS OF

Improved Adjustable Window Screens.
THE QUEEN ANNE. With box panels; the only screen made and finished alike on both sides.
THE EUREKA. The best cheap extension screen on the market.
SCREEN DOORS. Finished all ready to hang Sticks, Corners, Improved Frames, &c.
Write for circular and Price-list.



GEO. N. CLEMSON, Pres.

LOUIS DUHME, Vice-Pres.

ROBERT J. JOHNSON, Treas.

F. B. EARLE, Sec.

The National Saw Co.,

OPERATING

Wheeler, Madden & Clemson Mfg. Co., Middletown, N. Y. Woodrough & McParlin, Cincinnati, O. Woodrough & Clemson, Boston, Mass. Monhagen Steel Works, Middletown, N. Y. Richardson Brothers, Newark, N. J. Harvey W. Peace Co., Brooklyn, N. Y. Pennsylvania Saw Co., Philadelphia, Pa.

GENERAL OFFICE

96 & 98 READE ST.,

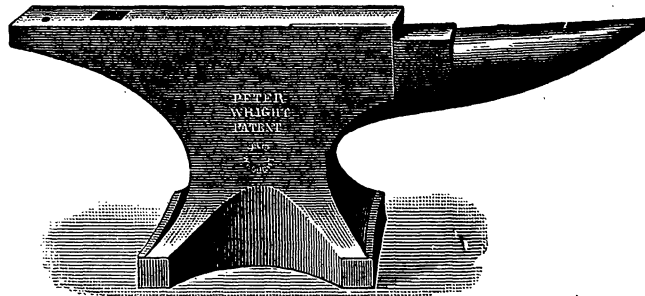
NEW YORK.

SAWS

Peter Wright's Patent Solid Wrought Anvil

PETER
WRIGHT
PATENTSOLID
WROUGHT

Fac-Simile of Trade-Mark.



Fac-Simile of Green Label.

By Royal Letters Patent.

V. R.

PETER WRIGHT'S
SOLID WROUGHT
ANVIL
Made of Best Scrap Iron!
THE BICK FACE AND END ALL
IN ONE SOLID PIECE!

You are cautioned in buying to see that each anvil is stamped with the full trade-mark on one side and has the green label affixed to the other.

EXHIBIT STAND No. 167,
GROUP 71.

WORLD'S FAIR.

BRITISH SECTION,
MACHINERY BUILDING.

PETER WRIGHT & SONS, DUDLEY, ENGLAND.

CIRCULAR,
BUTCHER,BAND,
BUCK

SAWS

—MANUFACTURED BY—

C. A. HILES & CO.,

336-338 Carroll Ave. CHICAGO

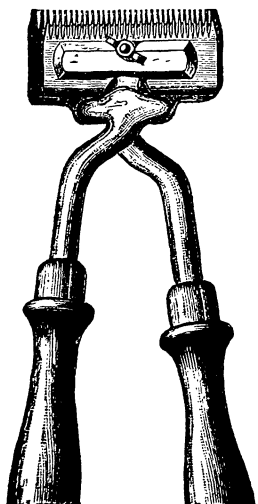
BUSINESS ESTABLISHED
1798.INCORPORATED
1891.

JOS. F. McCOY CO.

26 Warren St., New York,

Headquarters for

Coates' Horse Clipper

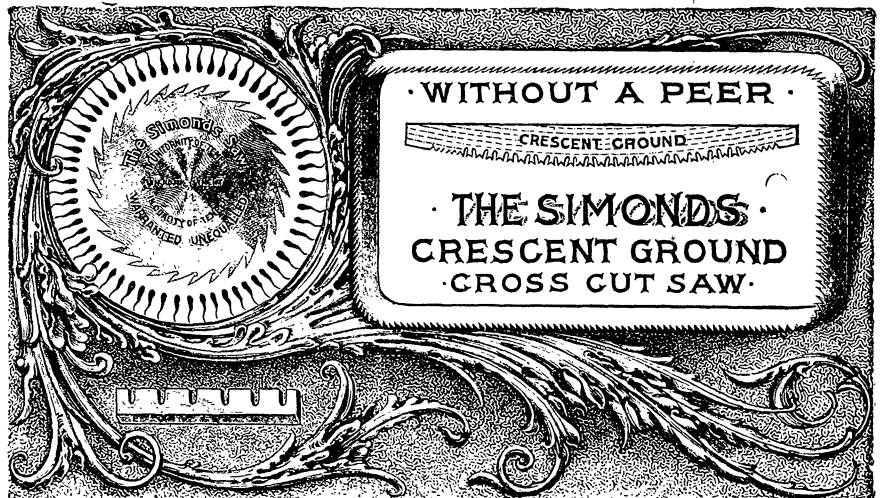


AND
Barber
Clippers.

ALSO
THE "BELL"
AND
THE "COMET"

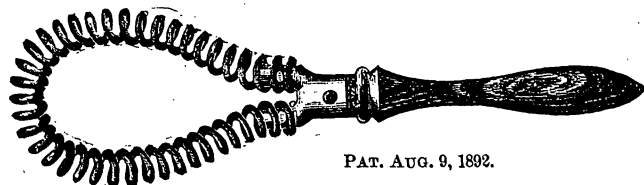
Horse
Clippers.

At prices to suit
the times.



Simonds Mfg. Co. Simonds Saw Co.
FITCHBURG, MASS. CHICAGO, ILL. SAN FRANCISCO CAL. PORTLAND, ORE.

THE BOSS DUST BEATER.



PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it's just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

Retail Price, 25 Cents. Sent by Mail, 35 Cents.

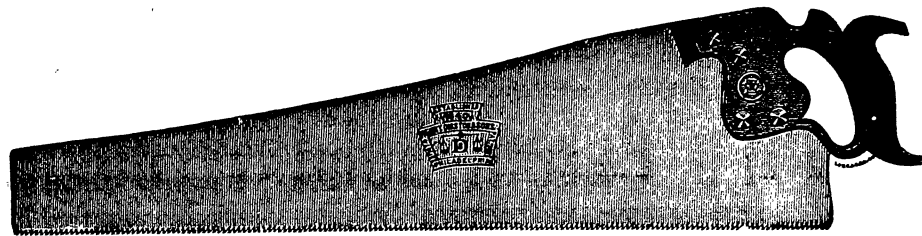
PEABODY & PARKS,
Manufacturers, TROY, N. Y.

"If you want a Saw it is best to get one with a name on it which has a reputation.
A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."—HENRY DISSTON.

THE SAWS THAT LEAD THEM ALL

DISSTON & SONS' PATENT D-8 HAND SAW.

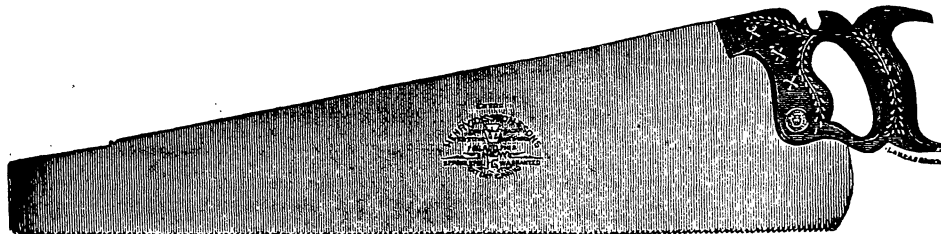
"THE
SAW;"
HOW
TO
CHOOSE
IT,
AND
HOW
TO
KEEP
IN
ORDER,
Sent
Free
on
Receipt
of
Name
and
Post Office
Address.



This Saw combines all the valuable improvements in Hand Saws that have been made by us of late. The first and most important is the hollow or skew back, the success of which can best be attested by the number sold. The peculiar shape of the butt or heel, coupled with the new method of fastening to the handle, give a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop on the proper point and a greater command over your Saw, by reason of being two inches nearer the point, which must give more power.

The Saw being let into the handle on a circle, has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

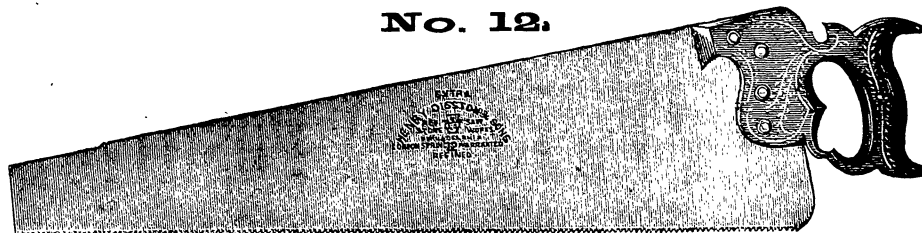
Our New No. 16 Premium Saw.



AN EXTRA FINE SAW IN EVERY RESPECT.

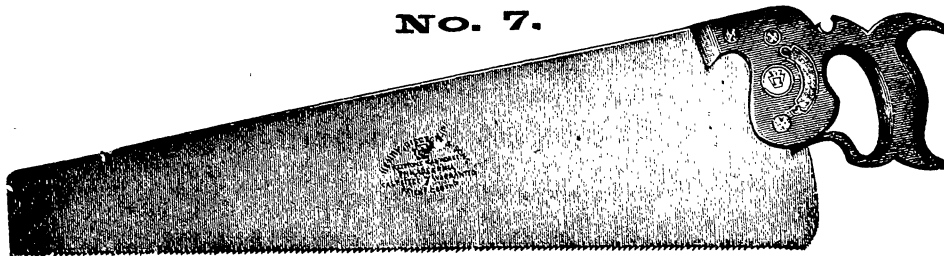
Having the Latest Close up Handle, Spring Steel Blade, Extra Thin Back, Finely Grained, with an Apple Handle and Four Brass Centennial Screws.

No. 12.



DISSTON & SONS' Extra Refined London Spring Steel, Selected and highly Polished Blade, Handle Carved and Polished, 4 Improved Brass Screws, the finest Hand Saw manufactured.

No. 7.



DISSTON & SONS' Cast-Steel, Warranted, Beech Handle, Polished Edge, 4 Improved Screws, Grained Blade.

"POCKET,
EDITION
OF
THE
SAWYER"
and
"LUMBER-
MAN'S
HAND
BOOK,"
Sent
Free
on
Receipt
of
Name
and
Post Office
Address

ASK YOUR DEALER TO ORDER THEM FOR YOU.

HENRY DISSTON & SONS

(INCORPORATED),

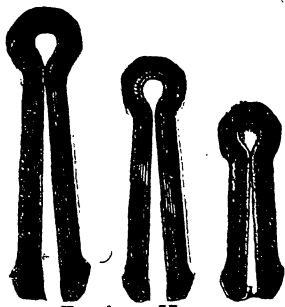
Keystone Saw, Tool, Steel and File Works, Philadelphia, Pa.

FACTORIES AT
AKRON, - OHIO.
CANTON, - OHIO.

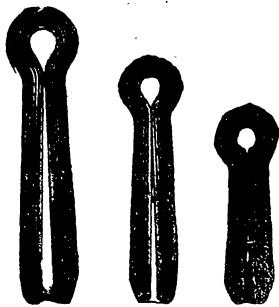
The Whitman & Barnes Mfg. Co.

FACTORIES AT
SYRACUSE, - N. Y.
ST. CATHARINES, ONT.

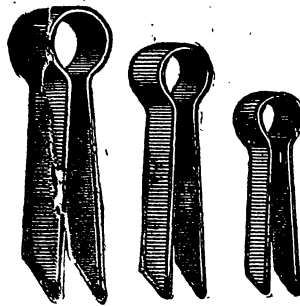
—MANUFACTURERS OF—



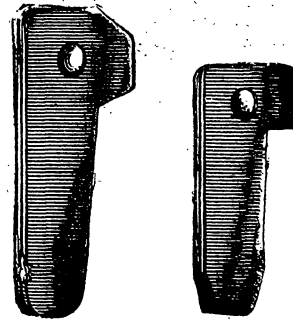
Spring Keys.



Spring Cotters.



Flat Spring Keys.



Flat Riveted Keys.

BRANCHES AT

79, 85 W. Monroe Street,
CHICAGO ILL.
1324 West 11th Street,
KANSAS CITY, MO.
126 Main Street,
CINCINNATI OHIO.

BRANCHES AT

32 So. Market Street,
BOSTON, MASS.
1917 Market Street,
PHILADELPHIA, PA.
33 Market Street,
SAN FRANCISCO, CAL.

NEW YORK OFFICE, 102 CHAMBERS ST.

THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

NICHOLSON FILE CO.
PROVIDENCE, R. I.

VARIETIES FILES
3000
X.F.J. AND INCREMENT CUT FILES

Philadelphia, 1876.

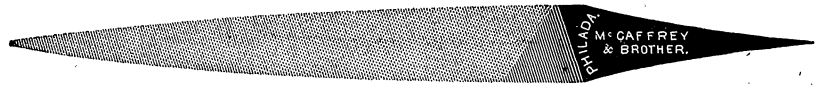


McCaffrey File Co.,

FIFTH and BERKS STS.,


PHILADELPHIA, PA.

For Superiority.



Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

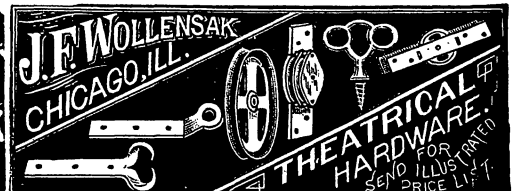
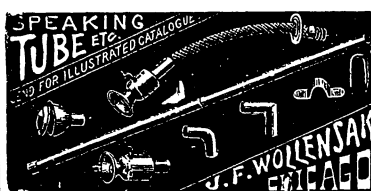
| | | | | | |
|-----------|--|--|--|-------------|--|
| BEST | | "TROJAN" HORSE RASPS. | | LOWEST | |
| CRUCIBLE | |  | | IN | |
| STEEL. | | | | PRICE. | |
| STRONGEST | | BANKER & WHITE, | | TROY, N. Y. | |
| TOOTH. | | (Troy File Works.) | | LET | |
| | | | | US | |
| | | | | QUOTE. | |

The Taintor Positive Saw Set.

Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

For Prices and Discounts, address

WIEBUSCH & HILGER, LTD., SOLE AGENTS,
84 and 86 Chambers Street, **NEW YORK.**

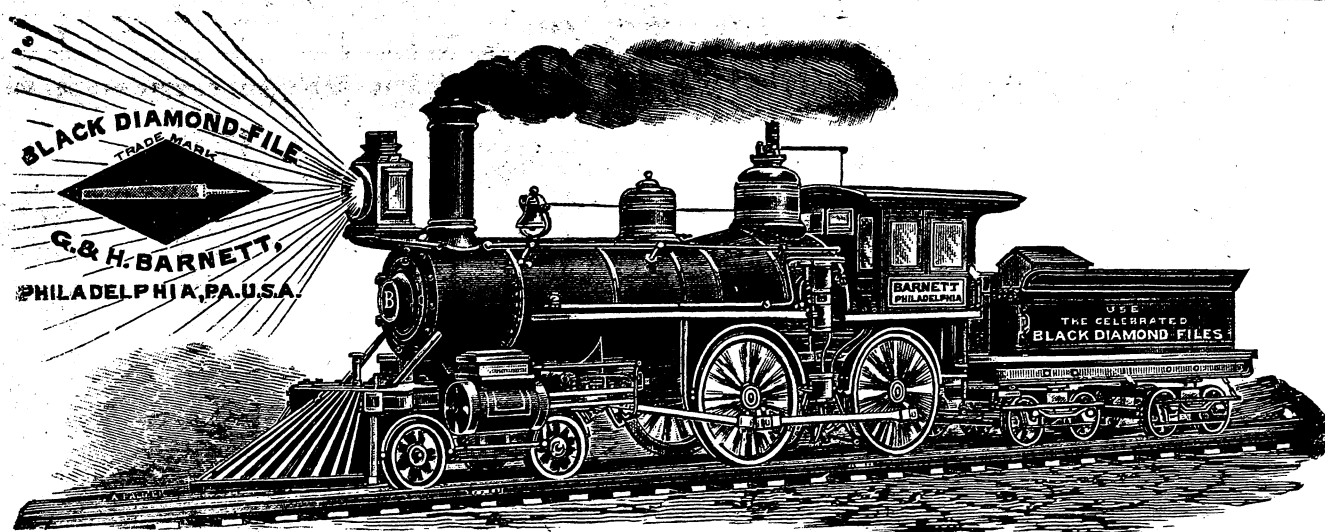


WM. KROGSrud,
Engraver and Die Sinker,
61 Fulton St., N. Y.
Manufacturer of
STEEL STAMPS
For Every Purpose.
Steel Letters and Figures.
Burning Brands, Stencils
&c. Send for Illustrated
Catalogue.



BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.**



J. M. KING & CO.,
WATERFORD, N. Y.

Manufacturers of
BUTTON'S

**Pat. Wire Cutter
AND PLIER COMBINED.**



Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and
MACHINISTS' STOCKS and DIES, PLUG and
TAPER TAPS, HAND, NUT and SCREW
TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

Established by DANIEL B. KING, 1829.

Warranted Better than the Best
ENGLISH ANVIL

Face in one piece of BEST TOOL CAST
STEEL, PERFECTLY WELDED, per-
fectly true, of hardest temper, and never
to come off or "settle." Horn of tough
untempered steel, never to break or bend.
Only Anvil made in the United States fully
warranted as above.

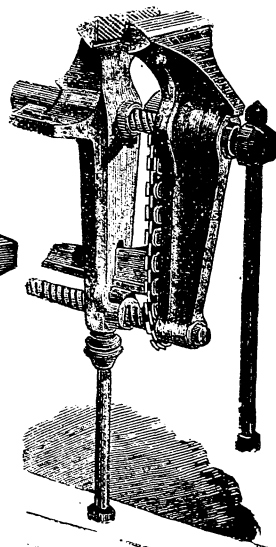
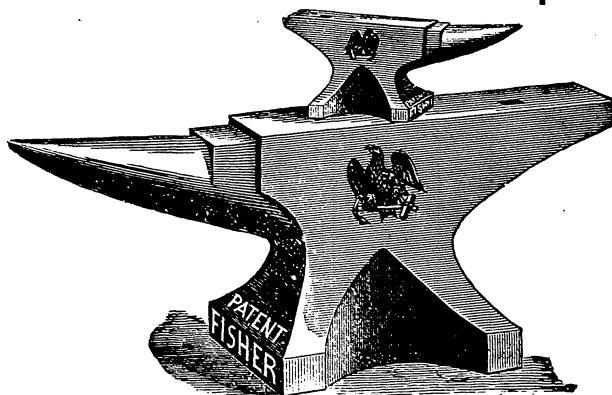
FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER
THAN ANY OTHER LEG VISE, AND
ALWAYS PARALLEL. Is the best Vise
for Machine Shops and Blacksmiths, and
for all heavy work. ACCURATE AND
DURABLE. Send for Circular.

ESTABLISHED 1843.
MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

EAGLE and "FISHER" Stamp.



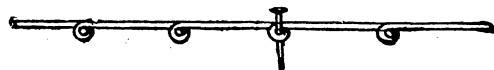
EAGLE ANVIL WORKS,

Trenton, N. J.

Sold in New York by our agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co.,
45 Chambers St.

Lightning Band for Cases and Crates.

(COVERED BY U. S. LETTERS PATENT.)



Mounted on reels and
always ready for use
and convenient to
handle. Easily and
quickly binds shipping
cases and crates in a
neat, strong and sub-
stantial manner.

PRICES:

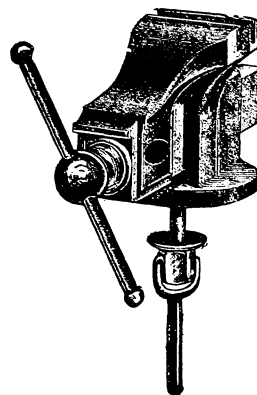
No. 1, per reel of 2000
ft., \$4.50 net.

No. 2, per reel of 2000
ft., \$4.75 net.

Flyers for cutting
wire, 50 cents extra.

No. 1 for cases under
300 or 400 pounds, and
No. 2 for all heavier
cases.

Buffalo Specialty Mfg. Co.
Sole Manufacturers,
Buffalo N. Y. U. S. A.



**HOLLANDS'
OFFSET JAW
VISE.**

Specially adapted
for drill press work
where chucks can-
not be used and
equally good for
special or regular
bench work.

Hollands Mfg. Co.,
ERIE, PA.,
Manufacturers all
styles VISES.



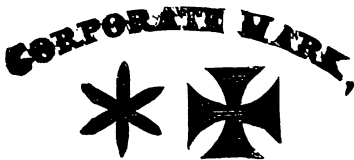
John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority,
against all Competitors, from

THE YEAR SEVENTEEN HUNDRED & FIFTY,
and are still in increasing demand. As in the past, it is the unalterable
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

SOLE AGENTS FOR THE UNITED STATES, AND THE CANADAS.
Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.



JOSEPH RODGERS & SONS, Limited.

—MANUFACTURERS OF—

Pocket and Table Cutlery, Scissors, Razors, Erasers, &c., &c.

These goods have fully maintained their reputation as the best cutlery in the world for over
ONE HUNDRED AND FIFTY YEARS.

Any Infringements of our Name and Corporate Mark will be promptly prosecuted.

Sole Agents for the United States,

ALFRED FIELD & CO., 93 Chambers and 75 Reade Street, New York.

Established 1836.

ALFRED FIELD & CO.

93 Chambers and 75 Reade Streets,

NEW YORK.

IMPORTERS OF

**HARDWARE CUTLERY, GUNS ANVILS,
CHAINS, FILES.**

SOLE AGENTS FOR

Joseph Rodgers & Sons, Best Cutlery in the world; W. K. & C. Peace, unrivaled Grass Hooks, Straw Knives and Scythes; Joseph Elliot & Sons, Celebrated Razors; Peugeot Frères, "French Toilet" and other Clippers; L. Hugoniot Tissot, Fine Steel Pliers, &c.; Eley Bros., Caps, Wads, Cartridge Cases, &c.; Webster & Horsfall, Steel Wire of every description.

Send for Rodgers' New Illustrated Catalogue

We manufacture all kinds of

EDGE TOOLS

of highest grade and sell at proper prices.

Send for Illustrated Price-List.

BUFFALO EDGE TOOL WORKS, Ridgway, Pa.
BUFFALO OFFICE, 42 Lewis Block.

— REMEMBER —

WE MAKE ONLY

The Very Highest Grade
OF

MECHANICS' TOOLS.

H. H. MAYHEW CO., Shelburne Falls, Mass

A. S. HENN & CO.,

Manufacturers of

Hardware Specialties, Can Openers, Pocket Wrenches, Mincing Knives, Clothes Line Pulleys, &c.

Send for Catalogue.

NEW HAVEN, CONN.



THE FOX SAFETY RAZOR.

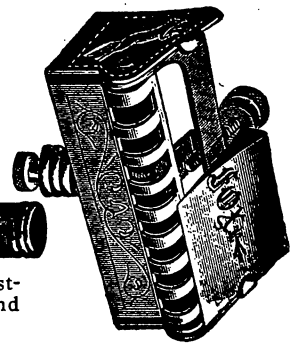
(U. S. Patent 484,116, October 11th, 1892.)

Is the finest and most practical in the world.

EVERY MAN HIS OWN BARBER.



Makes shaving a luxury; no danger of cutting. Adjustable blade. Silver plated frames. Sole manufacturer and patentee,



E. LOTHAR SCHMITZ, 92 Reade St., New York.

Sold by all the Leading Hardware and Outlery Houses.

Underhill, Clinch & Co.,

94 Chambers St., New York.

American Screw Co.'s Screws, Bolts, Rivets, &c.

Oliver Ames & Sons' Shovels.

Germantown Tool Works' Hammers and Hatchets.

Richardson Bros.' Saws.

Branford Lock Works' Locks, &c.

(Yale & Towne Mfg. Co., Lessee.)

GENERAL HARDWARE.



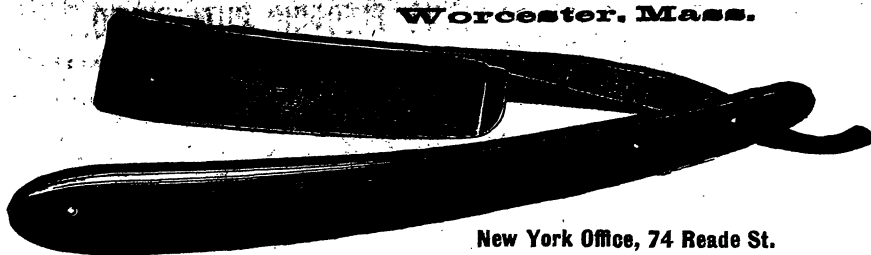
THE TRADE acknowledges our make of **BUTCHERS' STEELS**
THE BEST IN THE WORLD.

FOR CATALOGUES AND PRICE-LISTS ADDRESS

C. & A. HOFFMAN, Manufacturers, FRANKFORD, PHILA., PA.

J. R. TORREY RAZOR CO.,

Worcester, Mass.



New York Office, 74 Reade St.

Our Razors have become the standard for excellence and are no higher in price than the foreign. We manufacture and carry in stock more than 200 styles. Send for illustrated catalogue.

THE STANDARD. BUCK BROTHERS,

MILLBURY, MASS.

The Most Complete Assortment in the U. S. of

Shank, Socket Firmer and Socket Framing
Chisels.



TRADE MARK

PLANE IRONS.

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark also, "Riverlin Works."

Established 1825.

Incorporated 1892.

R. HEINISCH'S SONS CO.,

NEWARK, N. J., U. S. A.

New York office, No. 90 Chambers St.

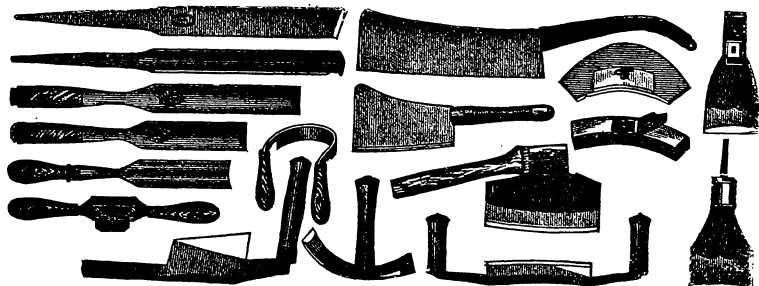
Tailors' Shears, Trimmers, Scissors, Tinnerns' Snips, etc.

CATALOGUES AND PRICES ON APPLICATION.

**WE HAVE NO CONTRACT WITH
MESSRS. HERMANN BOKER & CO. AS
AGENTS FOR THE SALE OF OUR GOODS.**

HIGHEST AWARD PARIS EXPOSITION, 1889.

ESTABLISHED 1837.
INCORPORATED 1892.



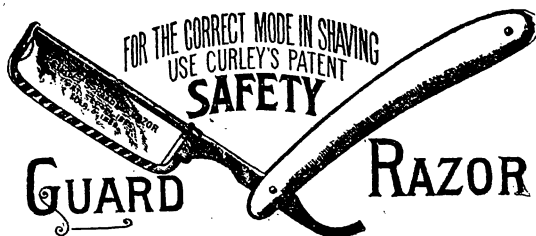
THE L. & I. J. WHITE CO.

BUFFALO, N. Y.

MANUFACTURERS
OF

EDGE TOOLS.

Coopers', Carpenters' and Ship Tools, Plane Irons,
Cleavers, &c. Full Line Chisels.



FOR THE CORRECT MODE IN SHAVING
USE CURLEY'S PATENT
SAFETY

GUARD

RAZOR

THIS improvement permits CORRECT SHAVING, therefore no irritation is caused, and the most inexperienced can shave with perfect safety.

We also carry the largest line in the United States of CUTLERY of every description.

J. CURLEY & BROTHER,

6 WARREN STREET,

NEW YORK.

Cast Shears.

ACME SHEAR CO.,

BRIDGEPORT, - CONN

MARTEN DOSCHER,

Commission Hardware,

88 Chambers St., New York.

Agent—G. W. Bradley's Edge Tools, Axes, Coopers' Tools, Cleavers, Bush Hooks, Draw Knives, Ship-Carpenters' Tools, &c. Also a full stock of Planes, Brooks' Bright Wire Goods, Washita Stone, and Taunton Tack Co.'s Rivets, &c.

ALASKA.

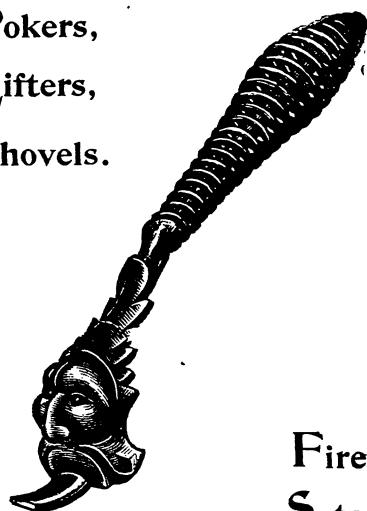
ALWAYS COLD.

Stove Trimmings.

Pokers,

Lifters,

Shovels.



Fire
Sets.

For Sale by All

First-class Jobbers in Hardware.

Made under Gaitly Patents and only by

Troy Nickel Works,

TROY, N. Y.

FRANCIS FROST & CO., Toronto, Ont.
Canadian Sales Agents.

WHEN IN WANT OF
WOSTENHOLM'S
I★XL



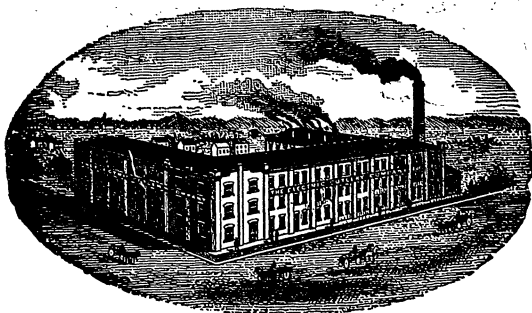
Knives or Razors,

SEND TO

FRED. B. GURNEY

116 Chambers St., N. Y.

The Best Equipped Cutlery Works in the World.



FACTORY: FOURTH & DICKERSON STS. NEWARK, N. J.

THE ELECTRIC CUTLERY CO.,

113 Chambers St., N. Y., and Newark, N. J.

Manufacturers of Razors, Knives
Razor Stropps, Scissors and Shears

(SEND FOR CATALOGUES.)

NORTHAMPTON CUTLERY COMPANY, NORTHAMPTON, MASS.

NEW YORK

SALESROOM,

122 Chambers
Street.

TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

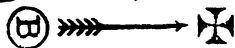
Send for Revised Catalogue.

W. & S. BUTCHER, Sheffield, England, and 135 Duane St., New York
Makers for over *One Hundred Years* of the celebrated "*W. Butcher*" Files and
Edge Tools and "*Wade & Butcher*" Razors, and the Original Manufacturers of Hollow
Ground Razors, can with confidence highly

recommend their goods and particularly their



Brand as being the most perfect *Extra Hollow Ground*
Razors ever manufactured and especially suited for the use of
Barbers and for private use. Genuine Razors are marked with
one of the following Corporate Trade-Marks:

WADE & BUTCHER
SHEFFIELD, ENGLAND

OR



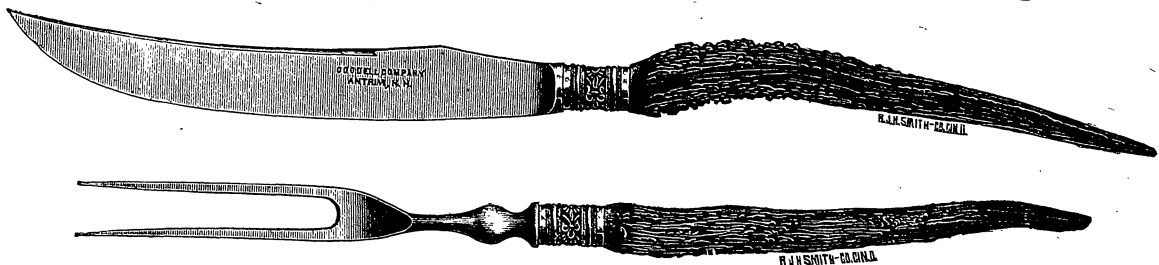
OR



FOR SALE BY ALL DEALERS IN HARDWARE, CUTLERY AND FANCY GOODS.

HOW IS YOUR STOCK OF CARVERS.

We make a specialty of Carving Knives that will take and hold an edge.



Most any man will pay a fair price for a pair of Carvers, but he wants good ones. Buy Goodell's and you can give him what he wants, make a profit and expect further trade. We can give you Wood, Bone, Stag, Im. Stag, Rubber and Celluloid handles, with blades of various shapes and sizes; also Table Knives, Butcher, Boning, Sticking, Skinning, Hunting, Bread, Cheese, Kitchen, Putty, Cigar and Shoe Knives. But-
ter Spades, Butcher Steels, &c., &c.

BEST IN THE WORLD. Catalogue Free to Dealers.

GOODSELL COMPANY, ANTRIM, N. H.

AGENTS:

ALFORD & BERKELE CO., 77 Chambers St., N. Y.

HENRY KEIDEL & CO., Baltimore, Md.

FAYETTE R. PLUMB,

Edge Tools
Hammers

AND

Sledges.

Penna. R. R., Tucker and James Sts.

Manufacturer of



Main Office and Works

Railroad,
Miners'

AND

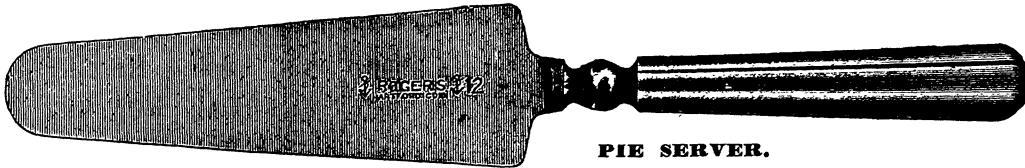
B. S. Tools.

Philadelphia, Pa., U. S. A.

— **NONE BETTER** —
 THAN THE



SILVER PLATED WARE.



PIE SERVER.

MANUFACTURED BY

THE W. M. ROGERS MFG. CO.,

Office and Factory, HARTFORD, CONN. P. O. Drawer 30.

NEW CATALOGUE FOR THE ASKING.

AZTEC COIN METAL

MADE INTO SPOONS AND FORKS.

Spoons and Forks of this metal combine all the following desirable features:

LOW PRICE, DURABILITY, UNIFORMITY AND STRENGTH.



QUETZAL PATTERN.
(NEW.)

MANUFACTURED ONLY BY

THE HOLMES & EDWARDS SILVER CO.,

Bridgeport, Conn.



outs, Kennel Chains, &c.; also cut to lengths for manufacturers' use.

The cut represents the exact size of 6/0.

Thirteen Sizes made, 6/0 being the Largest.

The Bridgeport Chain Co.'s Triumph

Chain, made into Halters
Traces, Cow Ties, Tie-

FACTORY AT
BRIDGEPORT, CONN.

"SHUT DOWN! What's the Matter?"

"BELT BROKE AGAIN!"

"See here, Mr. Foreman, if you don't have fewer stoppages I'll—"
 "Stop, Mr. Proprietor, the fault is yours. Quit buying belts that crack, peel, open between plies, stretch and break, and I'll give you a smooth run. You think it economy to buy cheap belts from Worthless & Co. Why! the time lost and trouble and annoyance caused by shut-downs would pay the difference between good and bad belts ten times over. Why don't you buy Cleveland's 'Shield High Grade,' sold by Reliable & Co.?" It has an established reputation, has been thoroughly tested, and is in use in all the large mills and elevators here. You take no chances on it. Besides, a strong warrantee is indelibly branded upon it, such as no manufacturer would dare put on a poor belt. You remember that threshing machine man, whose engine we repaired, said he had a Cleveland High Grade Belt in use over five years, and if it will stand such severe work, it certainly will ours."



Trade

Mark.

LABEL INDELIBLY STAMPED ON
EVERY 30 FEET OF BELT.

GUARANTEE.

We Guarantee our "Shield High Grade" Belt to be made of best long staple, 30 & 32-oz. cotton duck; To be the most durable, because it is made of best materials, by special machinery; To be the best selling belt, because it has the best reputation, a cleaner record of long service, and because its warrantee is stronger, bolder, broader than any other, and is irrevocable, protecting both dealer and consumer. We further guarantee that should any belt, under fair and reasonable service, fail or give out from any defect in material or manufacture, to replace same free of charge, on return to us.

Witness our hand and seal.



Cleveland Rubber Works

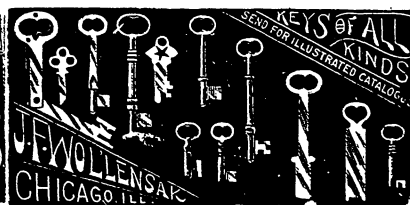
Of the Mechanical Rubber Co.

We are the only manufacturers who indelibly stamp a warrantee on each and every belt (see copy of label) and it remains as long as the belt lasts; and who give a written guarantee (see fac-simile). Our threshing machine belts have made a wonderful record, and our endless belts have given splendid service, the splice being as strong as the solid part of the belt. Suction Hose for Portable Engines and all other purposes.

We Want Your Trade.
Send for 60-page Catalog.
Write for Prices and Samples

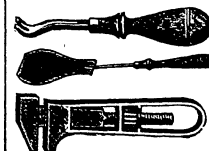
CLEVELAND RUBBER WORKS

OF THE MECHANICAL RUBBER CO., CLEVELAND, OHIO.



THE KNAPP & COWLES MFG. CO.,

BRIDGEPORT, CONN.



Makers of a large line of

STANDARD

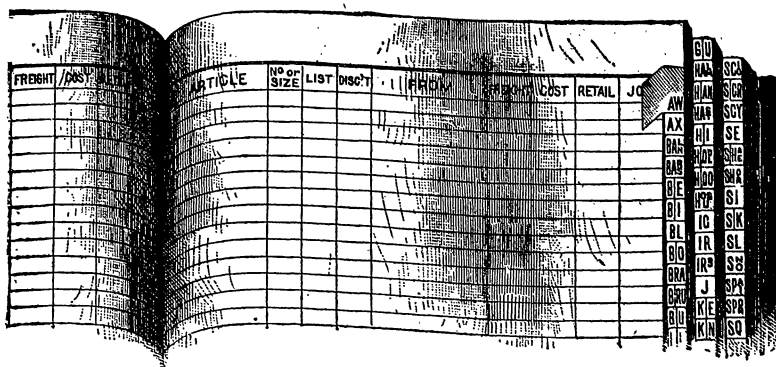
Hardware Specialties.

SEND FOR

K Catalogue.

The Iron Age Hardware Price Book E.

SECOND EDITION, REVISED AND ENLARGED, WITH MULTIPLE INDEX (Patent Pending).



AD GU SC
AN HA SCR
AU HAN SCY
AW HA^S SE
AX HI SH^E
BA^N HO^P SH^R
BA^S HO^O SI
BE HO^S SK

Fac-Simile of Indexing.

SIZE.—The book is 7 x 10 inches (much larger than Price Books A, B, C, or D), 350 pages.

PAPER.—The paper is the celebrated Crane's heavy ledger paper, tough and strong, permitting frequent changes and erasures.

BINDING.—The binding is of the very best quality—flexible seal grained leather.

INDEX.—By means of the arrangement shown in the cut the index applies to every page (except Supplement) and permits reference to any article at a single motion. This greatly facilitates the use of the book, avoiding the troublesome turning from page to page which is necessary in connection with other Price Books. It has been prepared with great care, and it is believed that it provides a place for every article in the Hardware line.

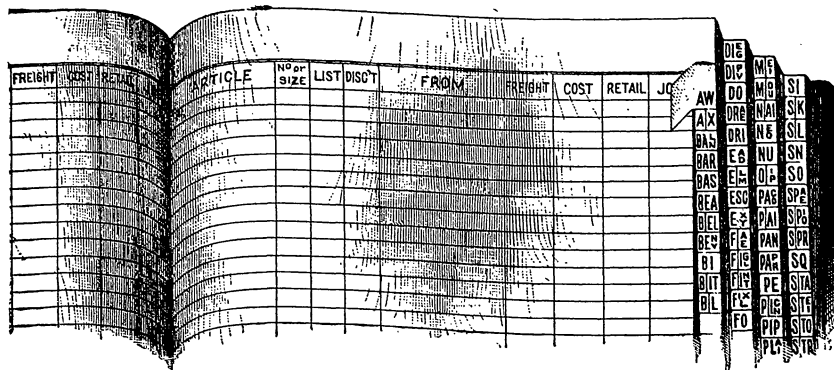
ARRANGEMENT.—The book is arranged to keep a complete record of prices on a single page, the width giving sufficient room.

SUPPLEMENT.—A 40-page Supplement is provided to give room for supplemental quotations, memoranda, tables, &c.

THIS BOOK IS ISSUED IN ONLY ONE EDITION, PRICE, \$5.00.

The Iron Age Hardware Price Book F.

WITH MULTIPLE INDEX (Patent Pending).



AD DI^E ME^F SI
AN DI^V MO^O SK
AU DO NAI SL
AW DR^A NE^O SN
AX DRI NU SO
BA^N E^D O^P SP^E
BAR E^M PA^D SP^O
BAS ESC PAI SPR

Fac-Simile of Indexing.

SIZE.—The book is 8 1/4 x 11 inches (much larger than Price Books A, B, C, D or E), 556 pages.

PAPER.—The paper is the celebrated Crane's heavy ledger paper, tough and strong, permitting frequent changes and erasures.

BINDING.—The binding is of the very best quality—flexible seal grained leather.

INDEX.—By means of the arrangement shown in the cut the four rows of index applies to every page (except Supplement) and permits reference to any article at a single motion. This greatly facilitates the use of the book, avoiding the troublesome turning from page to page which is necessary in connection with other Price Books. It has been prepared with great care, and it is believed that it provides a place for every article in the Hardware line, and gives ample space for recording prices.

Sufficient space has been provided for large lines of goods such as Axes, Bits, Springs, etc., by allowing four pages to such indices, instead of two pages, as for lines of goods requiring less space. This is accomplished, as in AX for example, in Book F by having a short tab with the letter A on the tab on the first leaf, and AX on the tab on the second leaf. The A on the first leaf is directly over the A on the lower leaf, so that the index reads AX whether looking at both leaves together, or at the lower one only.

The four rows of index tabs are printed in gold letters on black Russia leather. The tabs are securely fastened on both sides of each page, making a handsome and durable index.

ARRANGEMENT.—The book is arranged to keep a complete record of prices on a single page, the width giving sufficient room.

SUPPLEMENT.—An 80-page Supplement is provided to give room for supplemental quotations, memoranda, tables, &c.

THIS BOOK IS ISSUED IN ONLY ONE EDITION, PRICE, \$7.50.

Advantages of Multiple Index Price Book.

A SPECIAL feature of the books is the arrangement of the index characters, which, instead of being alphabetical, are arranged with special reference to the classification of Hardware goods, each index character giving the first two or three letters of the names of Hardware articles, as shown above. The ease and convenience with which the books can be used is indicated in the following examples, taken from Book F:

| | | | | | | | | |
|-----------------|---------|-----|---------------|---------|-----|----------------|---------|-----------------|
| For Augers, | turn to | AU | For Chisels, | turn to | CH | For Iron, | turn to | IRO |
| " Parers, Apple | " | PA | " Cutlery, | " | CUT | " Irons, | " | IR'S |
| " Saws, | " | SAW | " Cartridges, | " | CAR | " Shovels, | " | SH ^R |
| " Pumps, | " | PUM | " Rules, | " | RUP | " Grindstones, | " | GRI |
| " Bits, | " | BIT | " Locks, | " | LO | " Stones, | " | STO |

Special care has been taken to make the classification as indicated in the index correct and comprehensive, making provision for all Hardware articles and giving sufficient space for the keeping and recording of prices. It is thought that every strictly Hardware article has its first two or three letters given, thus permitting immediate reference to it by a single motion.

It is, however, obvious if any articles are not directly designated by the index characters, that the index, being alphabetical in its arrangement, indicates the place where quotations on such articles should be recorded. The supplement, however, may be found useful for quotations on any outside goods which the Hardwareman may desire to keep prices on, while at the same time it may be used if necessary for any overflow of matter from the preceding pages, or to contain list prices or other matter relating to goods.

Hardware Classification.—A pamphlet containing a classification of the leading Hardware articles is furnished with the price books.

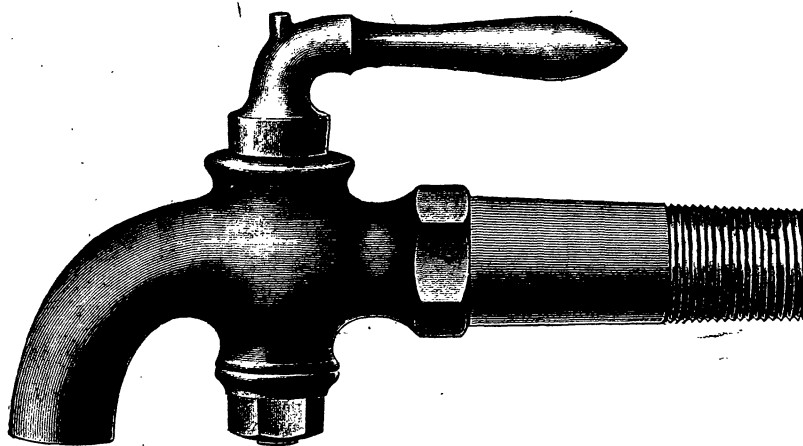
Standard Lists.—In connection with these price books a set of *The Iron Age* STANDARD HARDWARE LISTS can be used with great advantage. Price 25 cents.

These price books, which have been prepared by R. R. Williams, Hardware Editor of *The Iron Age*, are presented to the attention of Hardware men in the confidence that they will be found a most valuable aid in keeping track of prices.

Sent, Post-paid, on Receipt of Price, by

DAVID WILLIAMS, Publisher, - 96-102 Reade St., New York.

Standard Petroleum Oil Faucets.



These Faucets are made from the best Refined Iron, with Solid Brass Key, and are fully warranted. The bearing is longer than in the ordinary faucet, making them less liable to break. Made in following sizes.

| | $\frac{3}{8}$ in. | $\frac{1}{2}$ in. | $\frac{5}{8}$ in. | $\frac{3}{4}$ in. | 1 in. |
|--------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| SCREW SHANK, | No. 13 | No. 14 | No. 5 | No. 6 | No. 7 |
| TINNED " | No. 013 | No. 014 | No. 05 | No. 06 | No. 07 |
| LIST, | \$6.75 | \$8.25 | \$9.00 | \$10.50 | \$12.00 per Dozen. |

Write to us for Discounts, we can interest you.

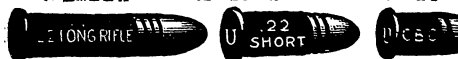
JOHN H. GRAHAM & CO., SOLE AGENTS,
113 CHAMBERS ST., NEW YORK

P. O. BOX 1042.

A Triumph in Small Bore Rifles. STEVENS' "FAVORITE" RIFLE.



10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET.

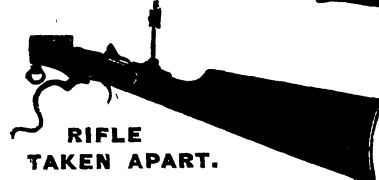


25 STEVENS

ABOVE TARGETS ARE
ACTUAL SIZE.

Made for the 22 or 25 Rim Fire Cartridge.

WEIGHT, 4 $\frac{3}{4}$ POUNDS.



RIFLE
TAKEN APART.

22-INCH BARREL.
LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.
IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.

- No. 17. Plain Open Sights.....\$12.50
No. 18. Vernier, Open Back, and Beach Front Sights..... 17.00
No. 19. Lyman Peep, Open Back, and Lyman Front Sights, 17.00

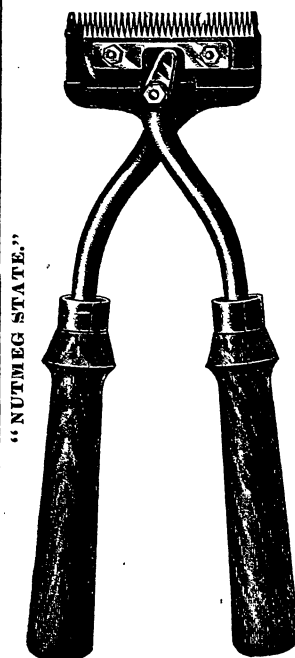
A 60 Page Catalog showing our full line of Fire Arms with TRADE PRICE LIST sent with pleasure to all dealers.

J. Stevens Arms & Tool Co.,

P. O. Box 5729.
Chicopee Falls, Mass. U. S. A.

Edward S. Hotchkiss,

MANUFACTURER OF HARDWARE,
BRIDGEPORT, CONN.



SATISFACTORY PRICES. Standard goods. Don't fail to write when in want of Horse and Barber's Clippers, No. 20 Steel Rat Killers, Curry Combs, Metal and Wood Choker Mouse Traps Lemon Squeezers, Baxter Pattern Wrenches, &c., &c.

AMERICAN TOOL COMPANY,
NEW YORK,
MANUFACTURERS OF
TOOL CHESTS

Of all sizes, complete with tools, for Hardware, Toy Notion and Variety trades.
Factory and Salesroom,

200 West Houston Street, near Varick.
Also Machinists' Tool Chests, empty. Illustrated Catalogue and prices furnished on application.

DAME, STODDARD & KENDALL,

IMPORTERS AND WHOLESALERS,

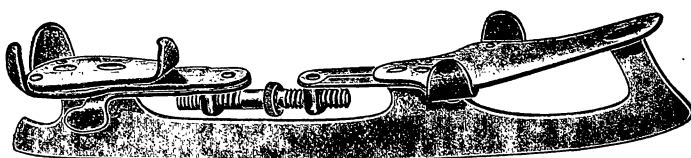
374 Washington St., Boston, Mass.

Headquarters for Winslow Skates.

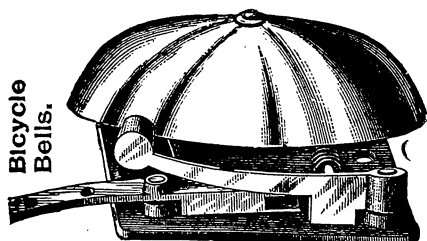
Obtain our Prices before Ordering Elsewhere.

1893-94 Catalogue Now Ready.

The SAMUEL WINSLOW SKATE MFG. CO., Worcester, Mass., U.S.A.



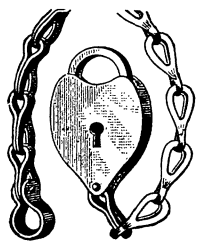
The most extensive Skate Factory in the World.



Bicycle
Bells.

BEVIN BROS. MFG. CO., Easthampton, Conn.
Manufacturers of

Sleigh Bells, House Tea, Hand, Gong Bells, &c.



Bicycle Locks.
Bicycle Bells.

Especially Low Prices

We manufacture
hardware specialties
of all descriptions to
order.

HAINES & ZIMMERMANN, 407 Cherry St., Phila.

**SHEETS,
COOKING UTENSILS,
MEDALS,**

**Sheets and Rivets for Boats
and Coffins.**

Bars for Horse Shoes.

**ILLINOIS PURE ALUMINUM CO.,
LEMONT, ILLINOIS.**

SICKELS, SWEET & LYON,

Wholesale Hardware.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

N. Y. AGENTS FOR

WINSLOW SKATES.

Eagle Files.

Union Steel Screw Co.'s Screws.

Orders for Skates should be placed early. Shipments from factory or
New York as preferred.

Fall Catalogue No. 6 Issued September 1st.

SICKELS, PRESTON & NUTTING CO.,

Wholesale Hardware and Tinnern's Stock.

N. Y. Office as above.

DAVENPORT, IOWA.

The English and American Mechanic:

AN EVERY-DAY HAND-BOOK FOR THE WORKSHOP AND THE FACTORY.

CONTAINING

Several Thousand Receipts, Rules and Tables indispensable to
the Mechanic, the Artisan and the Manufacturer.

By B. Frank Van Cleve.

A new, revised, enlarged and improved edition, edited by Emory Edwards, M.E.

ILLUSTRATED WITH EIGHTY-FIVE ENGRAVINGS.

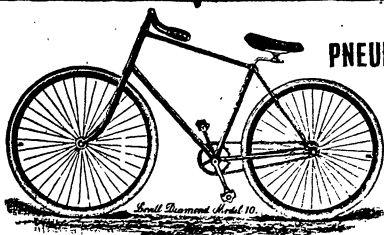
In one volume, 500 pages, 12mo, closely printed, containing a vast body of information of value
to all practical men. Elegantly bound in scarlet cloth, gilt. Price \$2.00.

SENT POSTPAID, ON RECEIPT OF PRICE, BY

DAVID WILLIAMS, Bookseller and Publisher,

96-102 Reade Street, NEW YORK.

Lovell Diamond Cycles

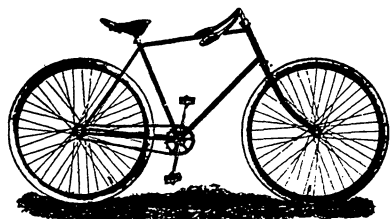


HIGHEST GRADE.
PNEUMATIC, CUSHION AND SOLID TIRES.
FOR LADIES AND GENTLEMEN.

MANUFACTURED BY
John P. Lovell Arms Co.
BOSTON, MASS.
CYCLE CATALOGUE FREE.

WESTERN WHEEL WORKS.

BICYCLE



MANF'TRS

From \$20

to \$135.

MOST COMPLETE LINE MADE.

OFFICE AND FACTORY:

Wells, Schiller and Sigel Sts., and N. Park Ave., Chicago, Ill., U.S.A.

A Wheel



Properly Designed,
Practically Made,
Combining Strength,
Durability and
Perfect Qualifications.
Such are the

S
O
L
D
S
I
G
H
T.

Dauntless

FALCON JUNIOR, for Boys.

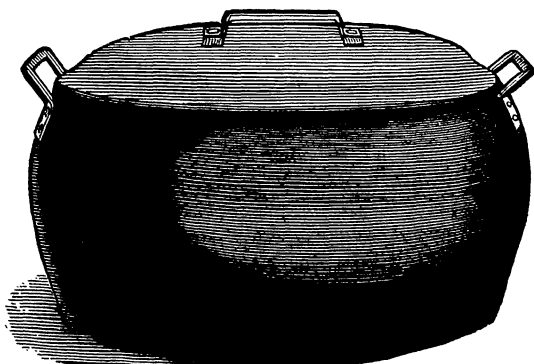
FALCON JUNIOR COMBINATION,
for Boys and Girls.

The only high grade juvenile wheels made. Full ball bearings, perfectly dust proof, $1\frac{1}{2}$ in. pneumatic tire, 24 in. wheels, graceful drop handle bars, combination cork and rubber handles.

The bearings are turned out of solid bar steel, and all material and workmanship are first-class. Made in the same manner, of the same stock, with the same care as the large wheels. Good juvenile wheels are scarce, and ours are going rapidly.

The W. Bingham Company, CLEVELAND, OHIO.

THE STUART & PETERSON CO., Burlington, N. J., U. S. A.



Hollow Ware,
Hardware Specialties,
Waffle Irons,
Coffee Roasters,
Iceing Bowls,
Mortars and Pestles,
Glue Pots,
Chemists' Goods,
Spittoons,
Caldrons,
Jacketed Kettles.

J

Yacht and Boat Hardware.

L. W. FERDINAND & CO.,

BOSTON, MASS.

Send for 212-Page Catalogue.



To Make a Bull's Eye

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

IDEAL MFG. CO., New Haven, Ct., U. S. A.

Please mention *The Iron Age* when you write.

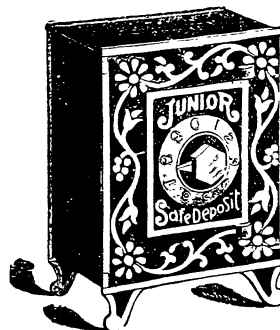
The Henry C. Hart Mfg. Co.

DETROIT, MICH.,

MANUFACTURERS OF

HARDWARE SPECIALTIES, Toy Banks, Etc.

B
I
G
G
E
S
T



B
E
S
T

JUNIOR Retail for . . . 25 cts.
NATIONAL Retail for . . . 50 cts.
IMPERIAL Retail for . . . \$1.00

The Largest Combination Lock Banks for
the Money on the Market.

20 OTHER STYLES.

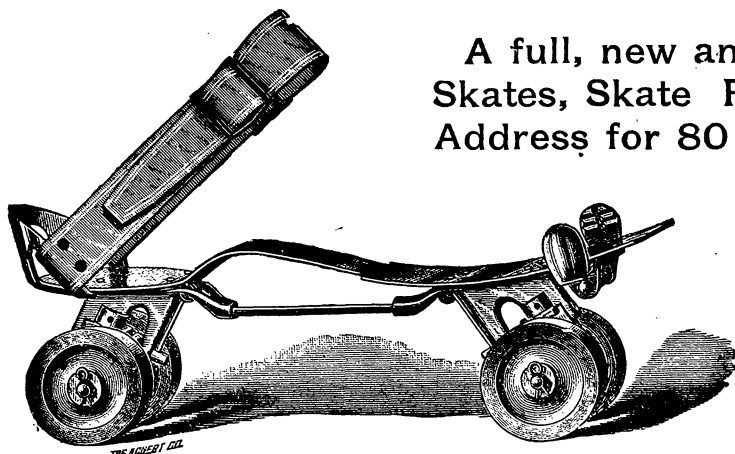
SEND FOR CATALOGUE.

IF YOU WANT THE BEST
BRITANNIA SPOONS
SEND TO
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
NICKEL SILVER SPOONS
SEND TO
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

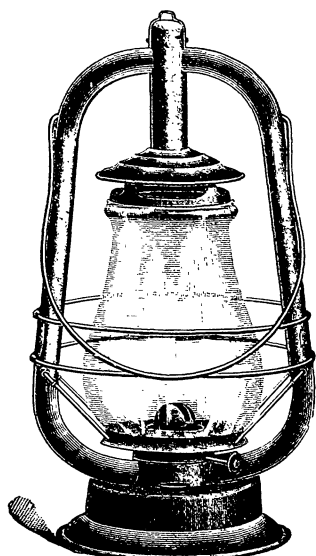
IF YOU WANT THE BEST
SILVER PLATED SPOONS
SEND TO
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

HENLEY'S CELEBRATED RINK AND CLUB ROLLER SKATES.



A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page catalogue and prices,

M. C. Henley,
RICHMOND, IND.



"A Thing of Beauty"

is a joy forever. The striking truth of this saying is shown at left hand side of this essay. The name of it is "Surprise Tubular." Its tubes are each made of one piece of metal, with smoothly rounded turns. No patched up unsightly elbows. The air currents flow through them as they ought to flow in a lantern. It stands more wind than any other lantern. To light it you pull a catch and it opens itself. It is not only the handsomest, but best lantern in actual operation that has ever been produced.

OHIO LANTERN CO.,
TIFFIN, OHIO.

W. W. PRYOR & CO.,

81 Chambers St., New York, Eastern Agents.

A full line of samples can be seen and the trade supplied at factory prices.



This GUN has rebounding locks and the barrels can be taken off and put on again without cocking the arm, and when cocked the hammers may be let down gradually, and without the full force of the blow. It is simple in construction, having very many less pieces than any other hammerless gun.

Easily Tipped and Cocked,
Damascus Barrels,
Handsomely Engraved,
French Walnut Stock.

SEND FOR DESCRIPTIVE
CATALOGUE.

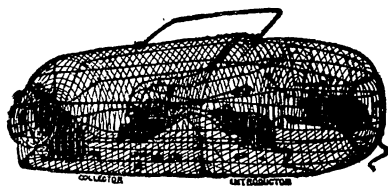


New Hammerless Double Gun,

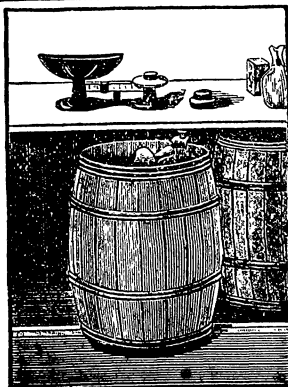
MANUFACTURED BY
FOREHAND ARMS CO.
Worcester, Mass.,

PRICE VERY LOW.

GENUINE **MARTY** RAT AND
ALWAYS IN STOCK. MOUSE
TRAPS



THEY DO THE WORK.
Orders solicited. Prices on application.
BURDITT & WILLIAMS,
20 Dock Square, Boston, Mass.
— SOLE AGENTS AND IMPORTERS —



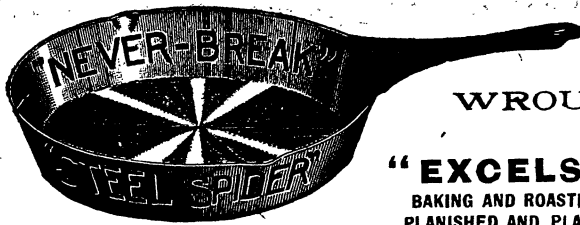
**Wonder Somebody Didn't
THINK OF IT BEFORE!**

The Perfection Barrel Swing.

A simple device, readily attached to any Pantry, Cupboard, Broad Shelf or under the counter in a Grocery or Hardware Store, for swinging a barrel to get at the contents easily. Price, \$1. All Hardware dealers will supply them.

MANUFACTURED BY

THE LEAVITT MACHINE CO.
ORANGE, MASS.



"MIRROR POLISH," the only Perfect Plain Steel Finish.

'NEVER-BREAK'

WROUGHT STEEL COOKING UTENSILS.

MIRROR POLISHED-TINNED-PORCELAINED.

"EXCELSIOR"

BAKING AND ROASTING PANS,
PLANISHED AND PLAIN STEEL

"PURITAN"

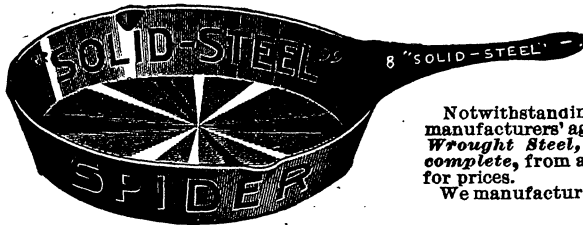
COOKERS, COFFEE POTS AND
OTHER SPECIALTIES.

"IDEAL"

BRASS, BRONZE, NICKEL UM-
BRELLA STANDS, CUSPIDORS,
ETC., ETC., ETC.

THE BRONSON SUPPLY CO.,
CLEVELAND AND NEW YORK.

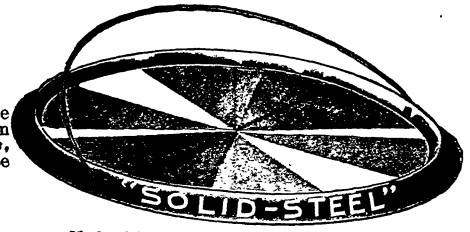
"SOLID-STEEL" SEAMLESS HOLLOW WARE.



No Seams, no Rivets in "Solid-Steel" Ware.

BRILLIANT FINISH.

Notwithstanding the claims made by some manufacturers' agents, our spiders are made from *Wrought Steel, Without Seams or Rivets, complete, from a single piece of metal.* Write for prices.
We manufacture our own goods.



Made either with Balls or Solid Handles.

The Cleveland Stamping & Tool Co., Cleveland, O.

We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.



No. 3

Globe Street Lamp.

Light your Streets and Driveways.

The S. G. & L. CO.

Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.
Equal to the best Gas Light.
Will not Blow Out in the Strongest Wind.
Will not Smoke.
Will not Freeze.
Automatic Extinguisher.
Outside Wick Regulator.
Will Burn Four Hours for One Cent.

MANUFACTURED BY

STEAM GAUGE AND LANTERN CO.,

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.

ESTABLISHED 1840.

A WORD TO THE WISE.

When you purchase a Lantern, Street Lamp or Driving Lamp, remember the

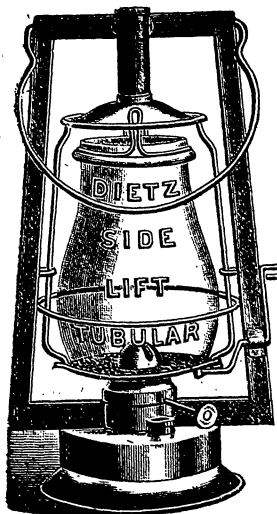
"DIETZ" Make

is the best. Our goods have stood the test of time and are safe and reliable. The name "DIETZ" is plainly stamped on them. Our specialty is Tubular Lanterns, Street Lamps and Driving Lamps. We make a large variety, being the oldest and largest house in our line.

ASK FOR THEM!

R. E. DIETZ COMPANY,

New York, 60 Laight St. U. S. A. Chicago, 25 Lake St.



Practical Electric Bell Fitting:

A TREATISE ON THE FITTING-UP AND THE MAINTENANCE OF ELECTRIC BELLS AND ALL THE NECESSARY APPARATUS
By F. C. ALLSOP.

CONTENTS.—Wiring, Soldering and Joining Wires and Earth Connections. Pushes, Pulls, Contacts and Switches. Bells, Relays and Indicators. Batteries. The Magneto Bell. Connecting-up. The Detector and Localizing Faults. Portable Sets. Index.
142 pages, with 141 illustrations, 12mo, cloth, \$1.25.

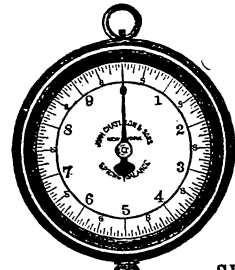
DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street,

NEW YORK.

John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST., NEW YORK.

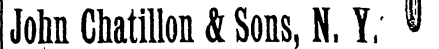


ESTABLISHED
1835.

SEND FOR
PRICE LIST.



Sole Agents for
Foster Bro.'s Butchers' Cutlery.



John Chatillon & Sons, N. Y.

The Enterprise M'f'g Co. of Pa.,

Third and Dauphin Streets,
Philadelphia.

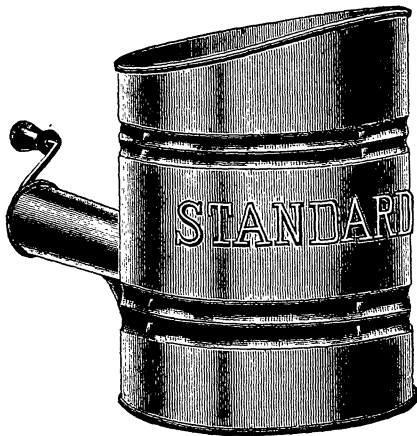
MEAT
Choppers



Enough
said!

SOLD BY ALL HARDWARE DEALERS. SEND FOR CATALOGUE.

SPEAKING OF SIFTERS?



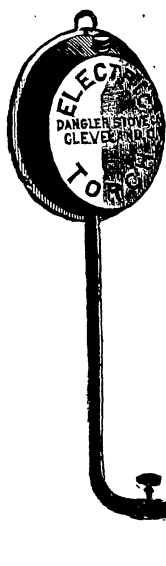
A few years ago a Sewing Machine cost \$75.00. Since the patents expired you can buy a better one for \$25.00.

SAME WAY WITH SIFTERS, SEE ?

SEND FOR CATALOGUE AND PRICES.

W. H. SILLS, - - Manufacturer,

86 Lake Street, CHICAGO, ILL.



Dangler
Electric
Torches

FOR
GASOLINE
OR
OIL.

14 JETS OF LIGHT,



3 to 6
INCHES
LONG.

FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co.,
Cleveland, Ohio.

LIGHT YOUR DARK SHOPS CHEAPLY.

Give your men plenty of Light and they will do double work.

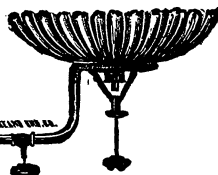


The Wall Torch has been used for several years as a means of illumination in Mills, Foundries, Machine and Car Shops, Tunnels, Street Stands, Band Stands, Smith Shops, etc.

While there are many cheap, inferior torches made which injure the sale of a good article, and condemn the Torch in general, our "Incandescent" Wall Torches are recognized as the best, and are now in use in the largest manufacturing establishments in the country giving **PERFECT SATISFACTION**, as is evidenced by the **DUPLICATE ORDERS** we receive from year to year.

They burn 150° Coal Oil, or 74° Naphtha, requiring a different burner for each.

In ordering be careful to state which is desired.



Price, for Single Torch, complete, \$2 each.

SPECIAL PRICE QUOTED FOR QUANTITIES.

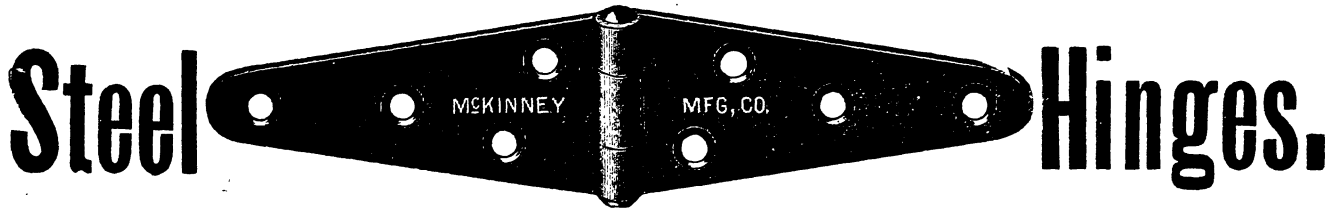
THE STANDARD LIGHTING CO.,

100 to 118 Perkins Ave., - - - - - Cleveland, Ohio.

WE CLAIM

That one pair of our Celebrated Steel Hinges will outwear two pair of the Flimsy Invention now being forced upon the attention of the trade.

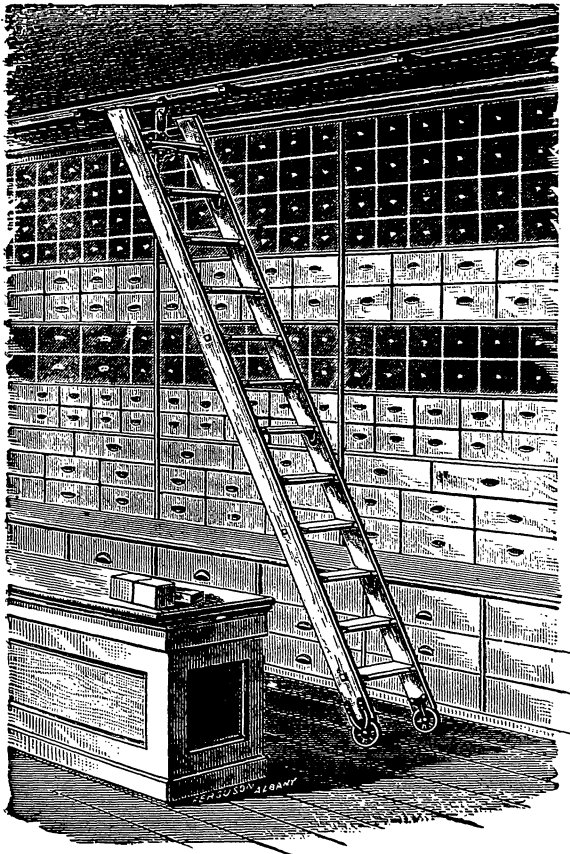
McKINNEY MFG. CO., ALLEGHENY, PA.



SEND FOR LIST.

"NONE BETTER."

THE "NOISELESS" STORE LADDER.

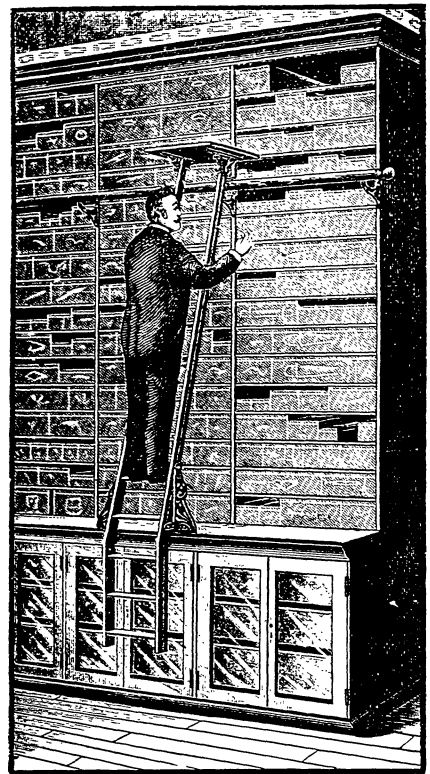


The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

M. CROISSANT,

ALBANY, N. Y.



THE BICYCLE STEP LADDER

The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made.

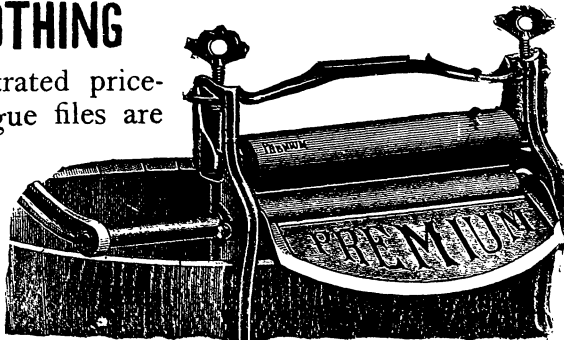
Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit.

Send for illustrated catalogue and prices. See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street, Chicago, Ills.

IT COSTS NOTHING

to send for our illustrated price-list, and your catalogue files are incomplete without it. Write to the Factory, Montpelier, Vt., or to our Chicago store, 68 Lake St.



COLBY WRINGER COMPANY.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller 96-102 Reade Street, New York.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

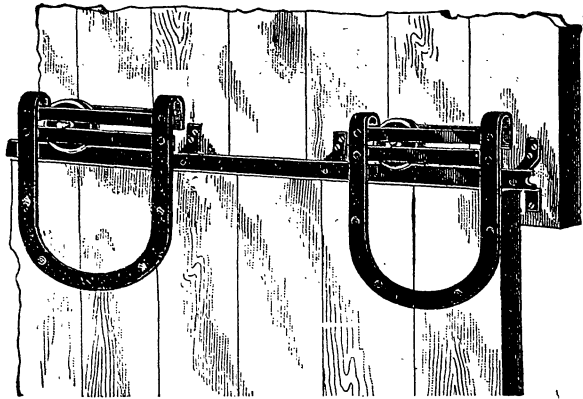
MANUFACTURED ONLY BY

"THOMAS MORTON,"

65 Elizabeth Street,

Write for Prices.

NEW YORK.



Lane's Patent Steel Barn Door Hangers,

"O. N. T." Track for same.

The first Anti-friction Steel Door Hanger placed upon the market and to-day stands as the original and best. Sold in all the States of the Union, as well as abroad. Also Lane's Noiseless Steel Parlor Door Hanger, using Single Steel Track, a great success.

Lane's Pat. Self-measuring Faucet, measuring liquids as drawn. Swift's Coffee Mills in great variety.

Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., NEW YORK.

He had in his possession 55 skeleton keys which the police claim would open any door.
—Chicago Tribune.

You are selling that kind of a lock every day and

your customers think you are selling the best the market affords.

ARE YOU SELLING the best the market affords?

The Craig Locks are guaranteed Sneak Thief Proof.

Send for Catalogue.

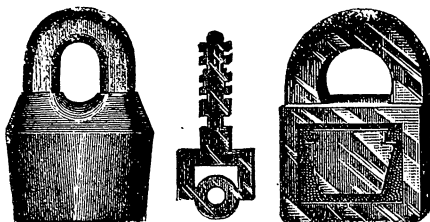
KEYLESS LOCK CO., I. A. 197 So. Canal St., Chicago, Ill.

KEYSTONE LOCK WORKS,

—Established 1879.—

E. T. FRAM, Lancaster, Pa., U. S. A.

MANUFACTURER OF



Patent Inter-Locking Tumbler Scandinavian or Jail **PADLOCKS**, in 50 grades and sizes. Key and **Self-Locking**. Brass, Bronze, Steel and Malleable Iron. Red, Black, Bower-Barff and Bright Brown finish. Also a full line of fine flat padlocks in Bronze and Steel. All fully described and illustrated in our new catalogue, furnished free to the trade.

SURPLESS, DUNN & ALDER,

General Agents, 97 Chambers St., New York.

SIMPLEST IN CONSTRUCTION.
EASIEST FITTED.



Cheapest and Best
Balance Made.

WRITE FOR CATALOGUE.

The Vanderbilt Sash Balance Co.,
CANANDAIGUA, N. Y.

General Agents, Harmon & Dixon, 118 Chambers St. New York.

COMMON MOUSE TRAPS
BEST FOR USE!

Ripley Mfg. Co., Unionville, Conn.



Porcelain-Lined Lemon Squeezers, Steak Hammers, Boot Jacks, Magnetic Tack Hammers, Mallets, Bung-Starts, Hand Screws, Beacon Hill Pat. Mouse Traps, Sunny-Side 2 lb. Lap Board.

PATENT PERFECTION PADLOCK

Eight Tumblers. Key Turning Both Ways.

Sizes; $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches; of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{4}$ and $\frac{5}{8}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price Lists and Circulars.



DO YOU WANT NON-PICKABLE LOCKS

For some extra severe service? For some place where they will be used many times daily by different persons? Would you like a higher degree of security than you get from any other lock you ever tried?

The "**Jackson**" Locks are recommended for just such service. Constructed upon new and original principles, they are strong, well finished and far more secure than any competitor.

We state for a fact that, so far as we know, these locks are unpickable. We make Latches, Hotel and Store Door Locks, Drawer, Cupboard, and Chest Locks, Post Office and Safe Deposit Locks, etc. Please order of your jobber.

MILLER LOCK CO., - Lock Manufacturers,
No. 4515 Tacony St., PHILADELPHIA, PA.



MECHANICAL DRAWING.

Progressive Exercises and Practical Hints for the Use
of All who wish to Acquire the Art With or
Without the Aid of an Instructor.

CONTENTS: Elementary Exercises, Straight Lines and Curves; Exercises in the Drawing of Non-Circular Curves; The Principles of Projection; Objects in inclined Positions; Of the Helix and its Application in the Drawing of Screws; Intersections and Developments of Surfaces; Isometrical Drawings, Cavalier Projections, and Pseudo-Perspective; The Spur-Wheel and the Bevel-Wheel in Inclined Positions; Construction of the Close-fitting Worm and Wheel; Construction of the Screw Propeller, Standard Sectioning, etc.

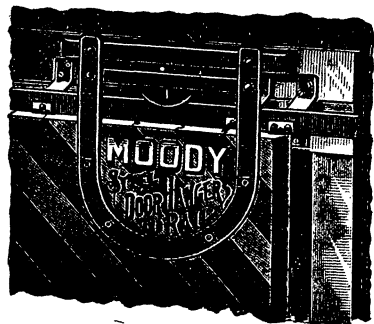
[By C. W. MACCORD, A.M., Sc.D. 10 x 12 inches. Cloth, \$4.00.]

[Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, - - - Publisher and Bookseller,

96-102 Reade Street, NEW YORK.

VICTOR MFG. CO., Newburyport, Mass.

STEEL RAIL.

Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

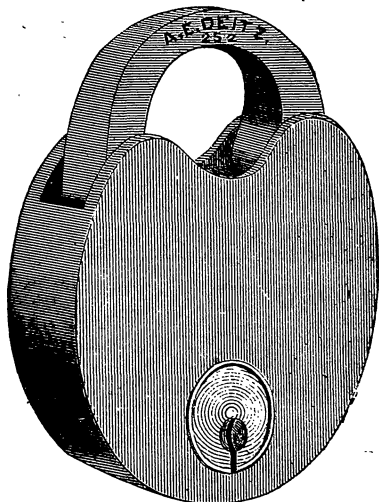
| PRICE-LIST. | | |
|---|---|---------------|
| HANGERS. | | Per Doz. pra. |
| No. 5, to run 6 feet, 3 1/4 in. wheel, | - | \$10.00 |
| No. 6, to run 10 feet, 4 1/4 in. wheel, | - | 15.00 |
| No. 7, to run 15 feet, 5 1/4 in. wheel, | - | 22.00 |
| RAIL, per foot..... | | 6 1/4 cents |

COMPLETE LINES OF

Artistic Builders' Hardware,
In Solid Bronze,
Wrought Bronze,
Rust-Proof Iron.

"VASSAR" CYLINDER LOCKS.

READING HARDWARE CO., - READING, PA.
NEW YORK, PHILADELPHIA, CHICAGO.

A. E. DEITZ

J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts., New York.

Factory, BROOKLYN, E. D., N. Y.

SASH WEIGHTS**E. E. BROWN & CO.,**

McKean and Meadow Sts.,

PHILADELPHIA PA.

JESSE JONES & CO.,**HARDWARE
SHELF BOXES**

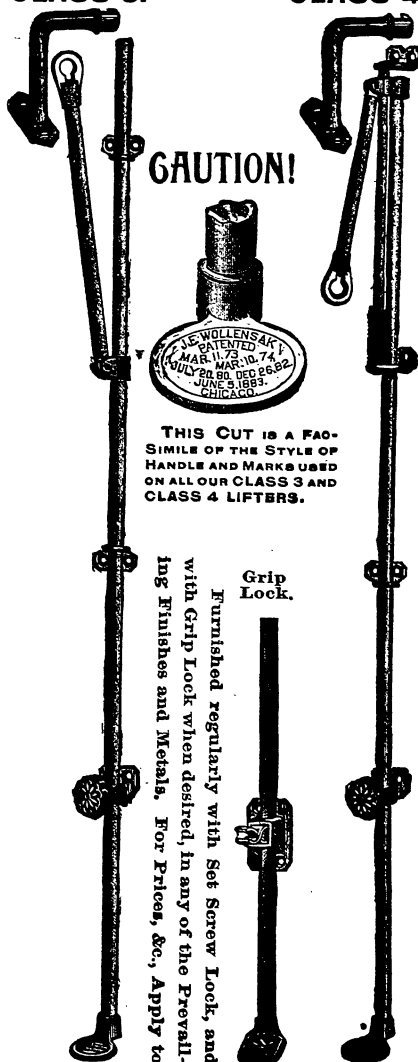
Made of Wood.
No screws or
nails used to work
out and cut
your shelving.

615 & 617 Commerce St., Phila.

Send for circular and list of references.

3

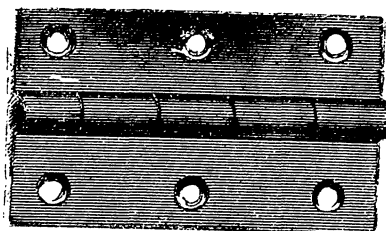
NICKLE, Silver and Bronze Metallic
Figures and Letters, Sizes 1/4 in to 3 in.
Pattern Letters, Steel Stamps, Brands,
Dies &c. Send for Reduced Price List.
We make a specialty of the Hardware Trade.
A. A. WHITE & CO., Providence, R.I.

Transom...Lifters**OLD RELIABLE****J. F. WOLLENSAK'S PATENT.****CLASS 3.****CLASS 4.****CAUTION!**

THIS CUT IS A FAO-
SIMILE OF THE STYLE OF
HANDLE AND MARKS USED
ON ALL OUR CLASS 3 AND
CLASS 4 LIFTERS.

**Grip
Lock.**

Furnished regularly with Set Screw Lock, and
with Grip Lock when desired, in any of the Prevail-
ing Finishes and Metals. For Prices, &c., Apply to

J. F. WOLLENSAK, CHICAGO, ILL.**Cast Brass Butt Hinges**

IN STOCK AND FOR SALE BY

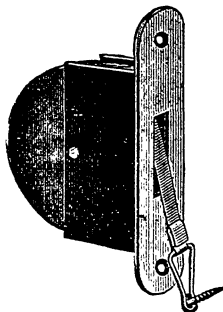
W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.

AN ACTUAL NECESSITY
with Architects, Builders,
and Railroad Corpora-
tions.

Simple, economical,
and low in price.

By using a steel
frame our balance is
much superior to
other makes.

Can be applied to
old as well as new win-
dows.

Requires no box
frames.

Warranted 15 years.

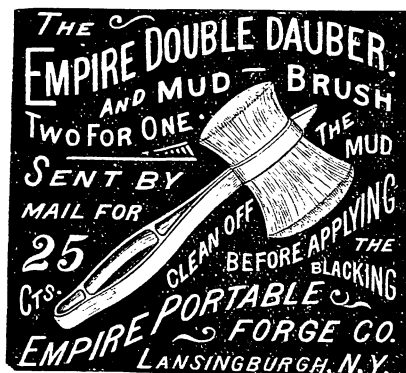
Cord lasts 5 years.

Write for price-list.

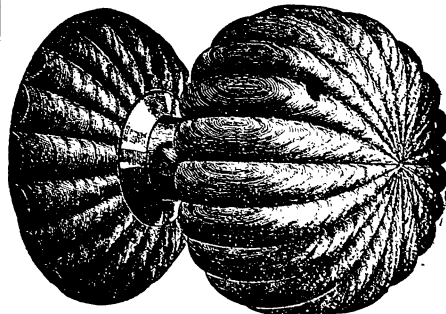
PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.

Chicago Office, 235 Lake St.



N. Y. Office, 103 Chambers St., W. H. QUINN, Manager




WOOD DOOR KNOBS,
DOOR SPRINGS AND CHECKS
AND CHECKING SPRING HINGES.

NEW GOODS. NEW PRICES.

Send for New Price-List.

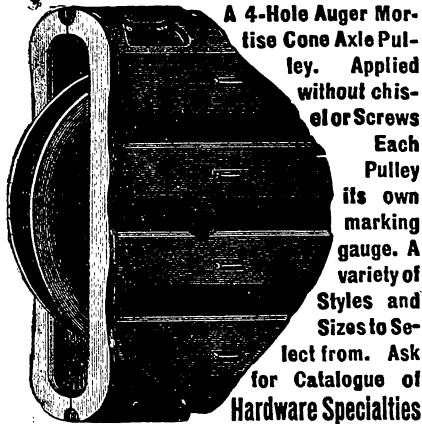
J. BARDSEY, 149 & 151 Baxter St. New York.



FROST'S ANTI-RATTLE
 Pat. Jan. 20, 1880.
Out One-half Size.
 Sample pair sent to any hardware or saddlery firm by addressing
The Frost Thill Spring Co.
 Boston, Mass.

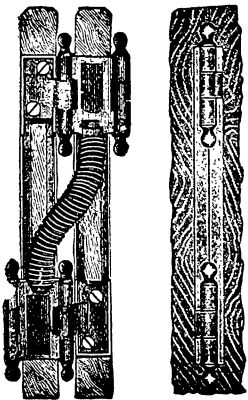
THE WILCOX & HOWE COMPANY,
BIRMINGHAM, CONN.,
 MANUFACTURERS OF
A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.
 Estimates cheerfully given. Send for Catalogue

IDEAL SASH PULLEY.



STOVER MFG. CO.
 145 River St., Freeport, Ill.

Chicago Spring Butts

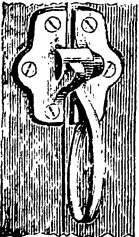


MANUFACTURED BY
Chicago Spring Butt Co.,
 Chicago, Ill.

| DOORS. | 1 | 21 | 31 | 41 | 51 |
|--------------------|--------------|---------------------|---------------------|-------------------|----------------------|
| | Jap'ed Pair. | Nickel Plated Pair. | Bronze Plated Pair. | Real Bronze Pair. | Polished Brass Pair. |
| 7/8 to 1 in. | \$1.20 | \$3.00 | \$3.00 | \$7.25 | \$7.25 |
| 1 1/8 to 1 1/4 in. | 1.50 | 3.75 | 3.75 | 8.00 | 8.00 |
| 1 3/8 to 1 1/2 in. | 2.50 | 5.50 | 5.50 | 10.75 | 10.75 |
| 1 1/2 to 2 in. | 4.00 | 7.50 | 7.50 | 18.00 | 18.00 |
| 2 1/4 to 2 1/2 in. | 7.00 | 10.00 | 10.00 | 27.00 | 27.00 |
| 2 3/4 to 3 in. | 10.00 | 14.00 | 14.00 | 36.00 | 36.00 |

Write for Catalogue and Prices.

P. J. Conroy & Co.,



Paschall, PHILADELPHIA.

"CONROY"
Refrigerator Door
Fasteners

Have rapidly supplanted all others.

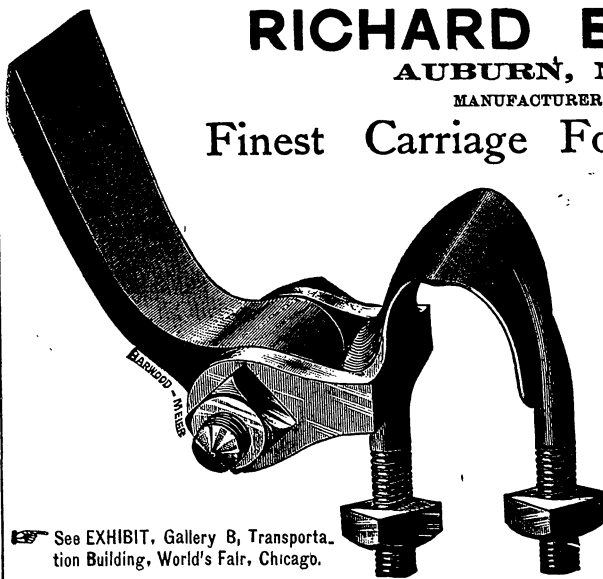
Refrigerator Trimmings.

Pat. Dec. 15 85.



All Tags and Labels on Covert Goods bear the above Trade-Mark, and are sold by all Leading Jobbers in General and Saddlery Hardware at Manufacturers' Prices.

COVERT MFG. CO.,
WEST TROY, N. Y.



RICHARD ECCLES,
AUBURN, N. Y.,
 MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.

See EXHIBIT, Gallery B, Transportation Building, World's Fair, Chicago.

Send for New Catalogue for Season 1893-94.

WHY USE WOODEN OR HEAVY STEEL BLOCKS
 WHEN THE STEEL AND IRON



TACKLE BLOCKS

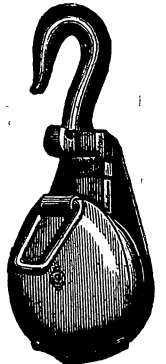
—MADE BY—

The Cleveland Block Co.

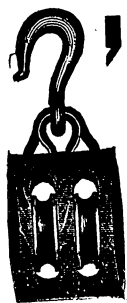
CLEVELAND, OHIO, U. S. A.,

ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.



General Agents: Topping Brothers, 92 Chambers Street, New York.
 The H. Channon Co., 22 Market Street, Chicago.
 New England Agents, - Dodge, Haley & Co., 212 High Street, Boston.



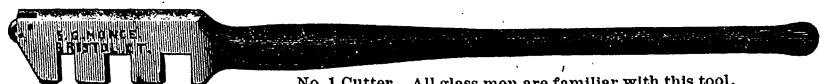
STEEL. WOOD OR IRON
 —MADE BY—
TOLEDO BLOCK WORKS.

511-513-515 Water St., TOLEDO, OHIO,

WILL PROVE SATISFACTORY

TO USER.

MONCE'S NOVELTY GLASS CUTTERS. —INTERCHANGEABLE LOCK STENCILS



No. 1 Cutter. All glass men are familiar with this tool.

S. G. MONCE, - - - BRISTOL, CONN.

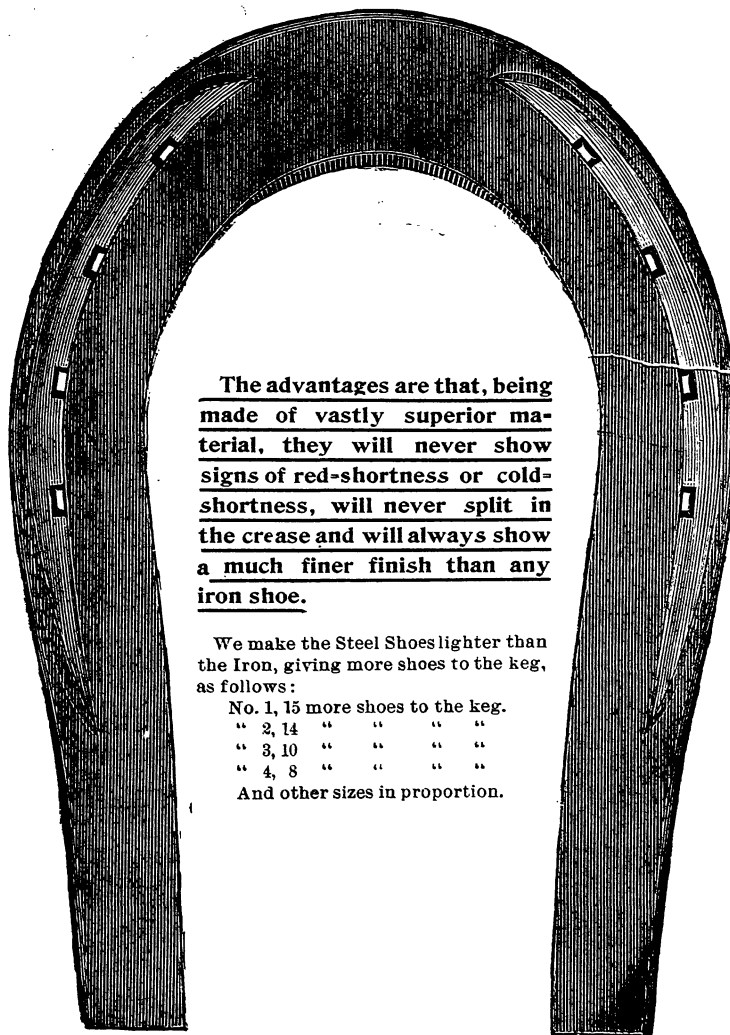
STEEL HORSE SHOES,

Like Steel Rails and Steel Nails,

HAVE COME TO STAY.

Shoenberger & Co., Pittsburgh, Pa.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 JUNIATA MULE SHOE.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

SHOENBERGER & CO.,

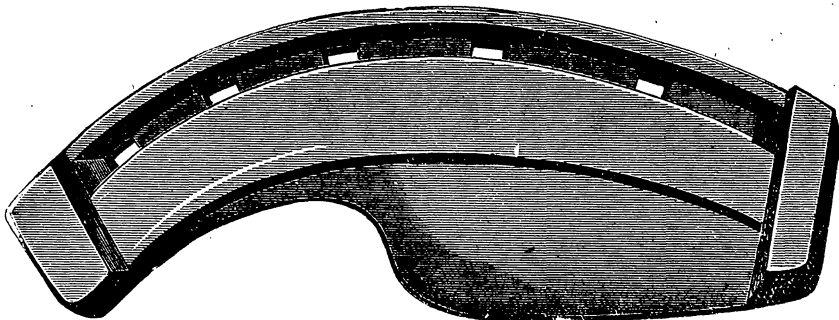
JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

SCRANTON FORGING CO.,

SCRANTON, PA

CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

FORGED
OX
SHOES.



Made under Deeble's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.

BURDEN'S HORSE SHOES.

"Burden Best"

Iron
Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

Standard Horse Shoe Co.,

Manufacturers of

HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

75 North Street, Boston, Mass.

Crescent

Horse and Mule Shoes,

BAR IRON.

CRESCENT HORSE SHOE AND

IRON CO.,

Max Meadows, Va.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,

CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,

MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.

WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

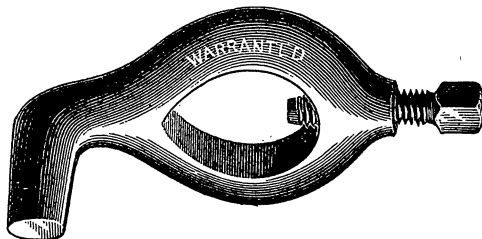
PHILADELPHIA OFFICE,
206 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE
11 Pine St.

LE COUNT'S HEAVY STEEL DOG,

With Steel Screws. U. S. Standard and the points hardened.



| | | | | | |
|---|------------|--------|---------|------------|--------|
| 1..... | 3/4..... | \$0 40 | 13..... | 2 1/4..... | \$1 35 |
| 2..... | 1..... | 50 | 14..... | 2 1/2..... | 1 45 |
| 3..... | 1 1/4..... | 60 | 15..... | 3..... | 1 60 |
| 4..... | 1 1/2..... | 60 | 16..... | 3 1/4..... | 1 80 |
| 5..... | 1 3/4..... | 70 | 17..... | 4..... | 2 10 |
| 6..... | 2..... | 70 | 18..... | 4 1/4..... | 2 75 |
| 7..... | 2 1/4..... | 80 | 19..... | 5..... | 3 25 |
| 8..... | 2 1/2..... | 80 | 20..... | 5 1/4..... | 4 00 |
| 9..... | 2 3/4..... | 95 | 21..... | 6..... | 5 00 |
| 10..... | 3..... | 1 10 | 22..... | 7..... | 6 00 |
| 11..... | 3 1/4..... | 1 20 | 23..... | 8..... | 7 00 |
| 12..... | 3 1/2..... | 1 20 | | | |
| One small set of 8, by 1/4 in. to 2 in..... 6 25 | | | | | |
| One set of 12, by 1/4 in. to 2 in., continued by 1/2 in. to 4 in..... 13 20 | | | | | |

When ordering, state as above, whether a full set, or a set of 12, or small set of 8, is wanted.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.

These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St London, England.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.



Elegant Iron.
Beautiful Shape.

HORSE SHOES,
Light, Medium and Heavy.
MULE SHOES,
Light, Medium and Heavy.

Illustrated booklet and prices to all
parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.

McKINNON DASH & HDW. CO.,

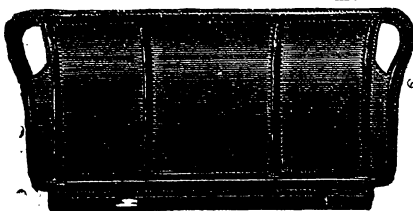
LIMITED, Manufacturers of

FINE QUALITY

DASHES

AND

FENDERS,



C PATTERN.

SURREY DASH.

BUFFALO, - N. Y.

P. F. BURKE, C. F. DEWICK & CO.
Successor to
Manufacturer of
PATENT STEEL
(Blunt and Sharp)
TOE-CALKS.
—ALSO—
BURKE'S IMPROVED
HORSESHOERS'
FOOT VICE.
Send for Circulars.
360 DORCHESTER AV. Die for Welding
BOSTON, MASS. Sharp Calks.

PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.,

Poughkeepsie, N. Y.

NEW YORK OFFICE, No. 66 Reade St.

AXLEINE



is a fine quality of Axle
Grease put up in square
tin boxes containing
one pound; beautifully
decorated in assorted
colors; designed espe-
cially for the Hardware
Trade. Showy and at-
tractive shelf goods.

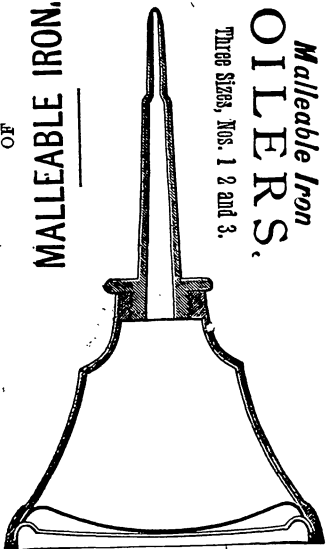
Send for sample and
prices.

LOVELL, TRACY & CO. 71 Asylum St.
Hartford, Conn.

BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.

Patented Articles
OF

MALLEABLE IRON.



New Improved
PATENT
Malleable Iron
OILERS.
Three Sizes, Nos. 1, 2 and 3.

Hammer's Adjustable Clamps.
Mall. Iron Hand Lamps.
M. I. Hanging Lamps

New Pattern Heavy Screw Clamps.
Strongest in the market.

For Sale by all the Principal Hardware Dealers.
SEND FOR PRICE LIST.

MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties
in Malleable Iron, made to order.

HAMMER & CO., Branford, Conn.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

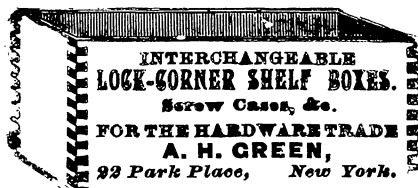
Manufacturers of

BOLT CUTTERS

AND NUT TAPPING MACHINES,

(Schlenker's Patent),

Send for Illustrated Catalogue.

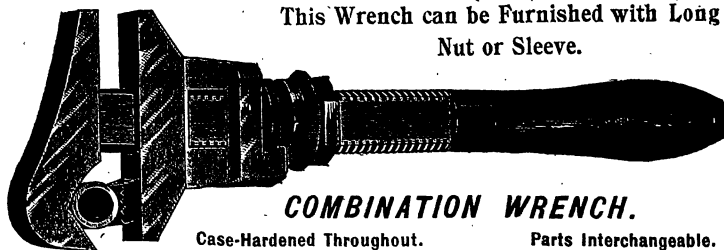


BERGER BROS.

Manufacturers of
TINNERS' HARDWARE.
Berger's Celebrated Pail Bars,
Sauce Pan Handles, Eave Trough
Hangers, Pipe Fasteners, Hooks,
Straps and Barrel Trucks,
&c., &c. Send for Prices
and Catalogue.

237 ARCH ST.,

Philadelphia, Pa.



This Wrench can be Furnished with Long
Nut or Sleeve.

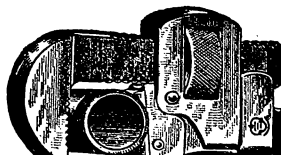
COMBINATION WRENCH.

Case-Hardened Throughout.

Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.
For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A



TRIMO PIPE WRENCH,

Forged Steel

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no
trouble in close quarters. Does not crush the pipe.

TRIMO

CHAIN

PIPE

WRENCH.



Superior in strength and ease of operation.
COMPLETE circular grip. Never slips nor crushes.

Can be used with one
hand and in closer quarters
than any other Basin
Wrench. Parts Interchange-
able.

TRIMO

BASIN WRENCH.

TRIMONT MFG. CO.,

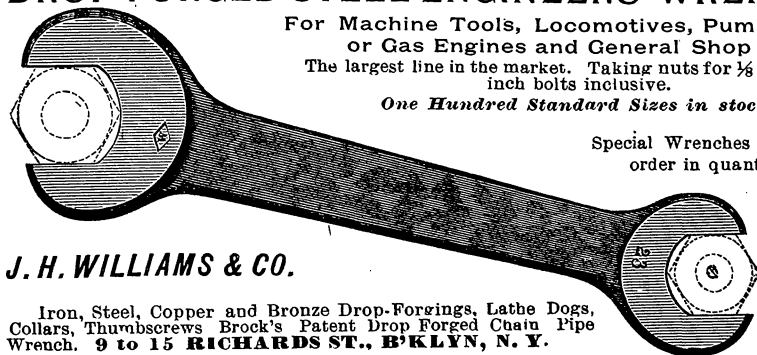
ROXBURY
MASS.

DROP-FORGED STEEL ENGINEERS' WRENCHES

For Machine Tools, Locomotives, Pumps, Steam
or Gas Engines and General Shop Use.

The largest line in the market. Taking nuts for $\frac{1}{4}$ inch to $\frac{3}{4}$
inch bolts inclusive.

One Hundred Standard Sizes in stock.



Special Wrenches made to
order in quantities.

Box and
Track
Wrenches.

J. H. WILLIAMS & CO.

Iron, Steel, Copper and Bronze Drop-Forgings, Lathe Dogs,
Collars, Thumbscrews Brock's Patent Drop Forged Chain Pipe
Wrench. 9 to 15 RICHARDS ST., B'KLYN, N. Y.

DOUBLE END WRENCHES



For Standard Hexagon Nuts

Finished or Unfinished

DROP FORGED from BEST BAR STEEL
in Lengths from 6 to 24 inches

Taking Nuts for $\frac{1}{4}$ up to and including Nuts for $1\frac{1}{4}$ inch bolts

THE BILLINGS & SPENCER CO.

HARTFORD, CONN.

"ALWAYS READY" WRENCH.

FORGED STEEL, NICKEL PLATED.

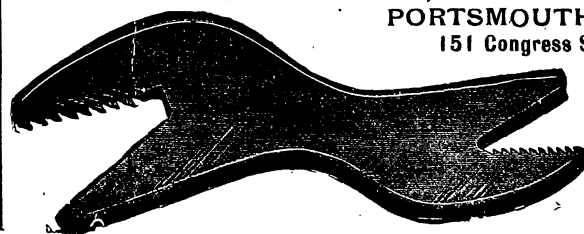
PORTSMOUTH WRENCH CO.,

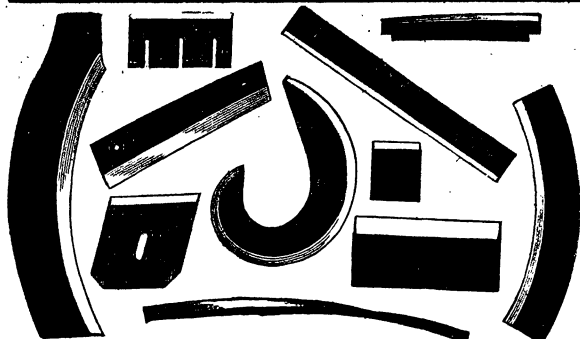
151 Congress St., Boston, Mass.

SEND FOR PRICES.

Machinists, Carriage Makers,
Blacksmiths, Mechanics, Spin-
ners, Weavers, Carders, and in
all Departments of Woolen and
Cotton Mills, Farmers, House-
keepers, and in fact everybody
that ever uses a wrench

NEEDS THIS ONE.





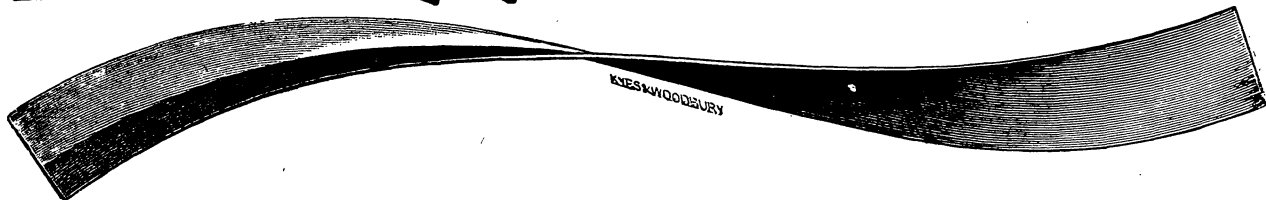
LORING COES & CO.

WORCESTER, MASS.

Manufacturers of MACHINE KNIVES.

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.



THE IMPROVED ACME STEEL WRENCH

PATENTED.

CAPITOL MFG. CO.,

Cable Address: "CAPITOL, CHICAGO,"

125 to 137 REES STREET,
CHICAGO, ILL., U. S. A.

Awarded Prize Medal at Paris Exposition and Jamaica Exposition



ACME-Standard Bright Finish.



HERCULES, Combination Pipe, Bolt and Nut Wrench. Bright Finish.



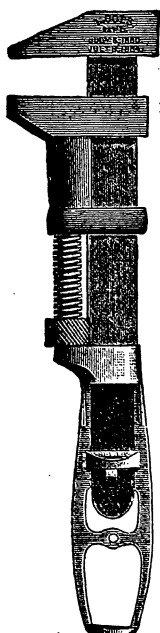
The Hercules Screw Driver and Tack Claw (Patented). This Screw Driver is made from one piece of special cast steel, in all sizes, from 1 1/4 in. to 12 in. The blade is well polished, carefully tempered, and every screw driver is subjected to a severe test and warranted. Handles Japaned with the best quality baking Japan.

The Strongest and Most Durable Wrench and Screw Driver Made. Write for Prices and Full Information.

HARMON & DIXON, 118 Chambers St., New York, N. Y., Eastern and Export Agents

• IMPROVED MINE LAMP •
FOR ANTHRACITE AND BITUMINOUS MINING
SEAMLESS BRASS COLLAR
BRASS HINGE
Solid Lid
NO SOLDERING
6 DIFFERENT STYLES OF SPOUTS.
SAMPLE 15¢.
B.E. LEONARD, Scranton, Pa.

PATENT AIR TUBE MINE LAMP.
FIVE DIFFERENT SIZED SPOUTS
SEAMLESS BRASS COLLAR
BRASS HINGE
Solid Lid
NO SOLDERING
HINGE CANNOT MELT OFF.
SEND 15 CENTS FOR SAMPLE TO
T.F. LEONARD • Scranton, Pa.



L. COES'

Genuine Improved
KNIFE HANDLE
PATENT

Screw Wrenches

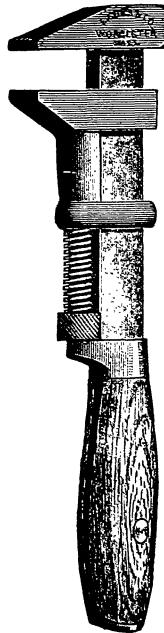
MANUFACTURED BY
COES WRENCH CO.,
WORCESTER, MASS.

Established in 1839.

Registered March 31, 1874.

Patented July 6, 1880.

Patented July 8, 1884.



Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

17 Straight Bar, Extra Long Nut for Screw in Jaw.

The BEST MADE and STRONGEST WRENCH in the MARKET

J. C. McCARTY & CO.,
JOHN H GRAHAM & CO } New York Agents.

Reliable Torches are what you want.



Made either for Oil or Gasoline.



These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

Write us for prices. A liberal discount given to the trade. Manufactured by THE SCHNEIDER & TRENKAMP CO., Nos. 479 to 497 Case Ave., Cleveland, Ohio

Better Days

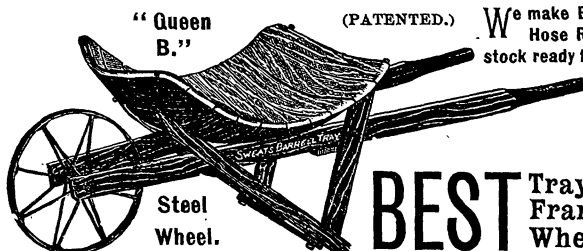
Will make better Business.

Business is improving.
Our trade is improving
and "constant improvement" in our productions is our motto.



THE KILBOURNE & JACOBS MFG. CO., Columbus, O., U. S. A
Makers of High-Grade Barrows and Scrapers.

"BARREL TRAY"
WHEEL BARROWS
ARE THE BEST ON EARTH.



(PATENTED.)

We make Barrows of every description, Factory Trucks, Hose Reels, Mortar and Brick Hods, and carry large stock ready for shipping.

Get our prices and we will get your order.

SWEATT MFG. CO.,

Minneapolis, Minn.

J. C. McCARTY & CO., New York, Direct Representatives.

G. A. SEAVER, New Orleans, Special Agent.

BEST Tray Frame Wheel.

Chadborn & Coldwell
Mfg. Co.,

NEWBURGH, N. Y.,

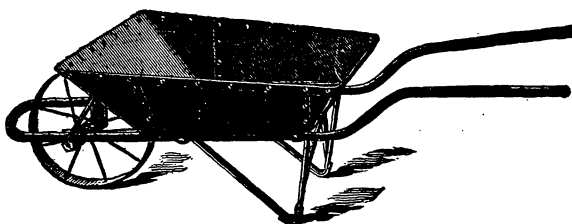
Sole Manufacturers of—



New Model
AND
Excelsior
LAWN
MOWERS
ALSO
The Rival,
The O K,
Etc., Etc.

Send for Illustrated Catalogue.

Akron Tubular Steel Wheelbarrows.



Re-enforced Tray, Strong and Durable.

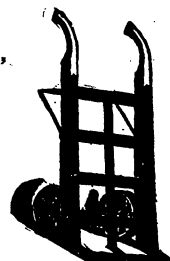
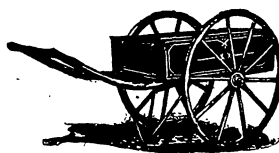
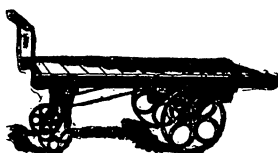
Also McNeil's Patent Balanced Charging Barrows, Automatic Dump.

Write us for Prices.

THE AKRON TOOL CO., AKRON, O.

LANSING WHEELBARROW CO., Lansing, Mich.,

MANUFACTURERS OF
EVERYTHING in the way of Steel and Wood Barrows,
Warehouse Trucks and Hand Carts,
SEND FOR CATALOGUE.



Boss Sprinkler.

For Potatoes, Tobacco,
Cotton and all small
Plants and Vines.

Has given satisfaction
to all who have
handled it.

Prices and Circulars sent
on application.

OLIVER A. SMITH,
CLARKSTON, MICH.



The Cockburn Barrow and Machine Co.

OFFICE AND WORKS:

234 to 240 Eleventh St., JERSEY CITY, N. J.

NEW CONCRETE MIXING MACHINES.

Coal and Ash Buckets, Coaling Tubs, Coal and Coke Cars, Patent Tubular Frame Wheelbarrows, Furnace Charging Barrows and Cars, Sheet Iron Work of every description, Patent Power Punching Machines, Every description of General Forgings, Dimpfel Blow Machine Work.

Magical Experiments; or, Science in Play.
By ARTHUR GOOD. Translated by CAMDEN CURWEN and ROB WATERS. The experiments explained include some designed merely for recreation, with many really scientific in character. These latter are given with a view of stimulating an interest in the study of physics. 320 pages, illustrated, 8vo cloth. \$2.00.

For sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.

HALL'S HUSKERS

FOR SALE BY ALL JOBBERS.

MADE BY

HALL & ROSS HUSKING
GLOVE CO.,

CHICAGO, - ILLINOIS.



Our trade-mark is on every pin we make.

ALL STEEL WHEELBARROWS & SCRAPERS

MANUFACTURED BY

AMERICAN STEEL SCRAPER CO.,

1104 Court Street, SIDNEY, O.



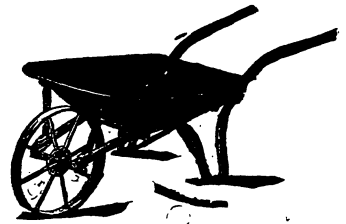
Write
for
Catalogue

What's Your Idea

Of a wheelbarrow? Do you think that the cheapest is that which costs the least generally? It's a mistake; there's nothing so expensive as an inferior product, no matter how cheap the first cost. "You may delude a customer sometimes, but you can't delude some customers all the time." Do you see the point? Good goods at fair prices at

SIDNEY STEEL SCRAPER CO.,

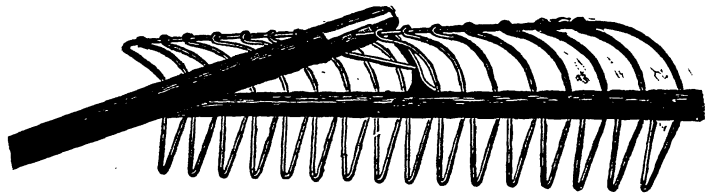
924 Poplar St., Sidney, Ohio.



LAWN RAKES. The "GEM" AND "DAVIS."

Both good and each the best. If you have not stocked up, better do so at once. Our prices are low.

SCHAEFFER & CO., Dayton, O.

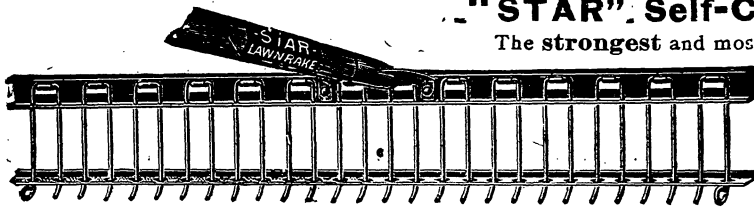


"STAR" Self-Cleaning Lawn Rakes. All Steel.

The strongest and most practical rakes in the market. The cleaning bar keeps the teeth free from leaves and grass and the eyes on the end teeth prevent the other teeth from digging in the ground. We also make "STAR" Lawn Rakes as above without the self-cleaning bars and turned up end teeth.

SYRACUSE SPECIALTY MFG. CO., Syracuse, N. Y., U. S. A

SURPLESS, DUNN & ALDER, 97 Chambers St., New York, DIRECT REPRESENTATIVES.



"STAR" Self-Cleaning Lawn Rake.
Pat. Feb. 21, 1893.

A REVOLUTION

In Lawn Mower Construction.

Frame of single piece of wrought steel. No breakable cast iron bed plate. Bed knife riveted to frame. Adjustment in wiper. All parts steel and malleable iron except drive wheels and pinions.

HIGH WHEEL. HIGH GRADE. LOW PRICE. Fully Guaranteed.

MANUFACTURED BY

W. E. LAPE, Syracuse, N. Y.

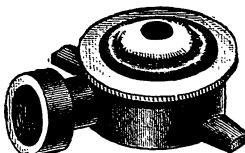


Japanese No. 12,
Adjust.

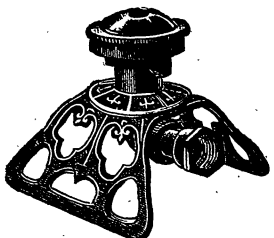
LAWN SPRINKLERS.

We manufacture the BEST and CHEAPEST Lawn Sprinklers in the World.

Cactus No. 9.



The only Sprinklers which have no revolving parts to leak or wear out.
The only Sprinklers free from small holes, and which cannot become clogged with gritty substances.
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures.
We also manufacture the old style revolving sprinklers, but for our own use would not have them as a gift.

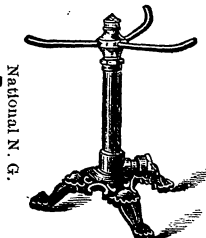


Cactus No. 5.

Ette & Henger Mfg. Co.

ST. LOUIS, MO.

SEND FOR DESCRIPTIVE CIRCULARS.



National N. G.

HAY KNIVES

SEASON OF 1892-93.

"LIGHTNING"

(Reg. Trade-Mark No. 9583.)

"BLIZZARD"

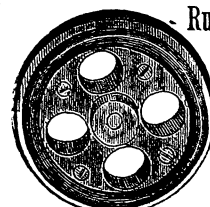
Reg. Trade-Mark No. 19,390.

It pays to handle **FIRST CLASS** goods.



Write us early for prices and terms.

Sole Manufacturers,
The HIRAM HOLT COMPANY
EAST WILTON, MAINE.



Rubber and Iron Wheels

Casters for Trucks,
Baskets and Boxes
Heavy Casters for
Mill use.
Catalogues free.
H. P. CLARK, Box 0,
Windsor Locks, Conn.

PENNSYLVANIA.

INVITATION.

We cordially invite our friends and customers to visit our Exhibit at World's Fair, Chicago, where will be seen the finest and most complete line of Lawn Mowers ever put on the market.

REMEMBER THE LOCATION:

Horticultural Building, North Wing, Section F, Column 73.

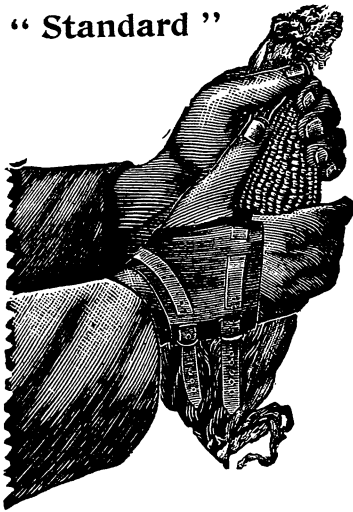
SUPPLEE HARDWARE CO.,
PHILADELPHIA.

New Quaker City

Great American.

CONTINENTAL.

The
"Standard"



Corn Husker

Easier to use, does more work, can be used in any manner, doesn't interfere with tying fodder. Guaranteed the cheapest practical Husker made. Write,

Moore & Wickert, Mfrs.,

GREEN SPRING, OHIO.

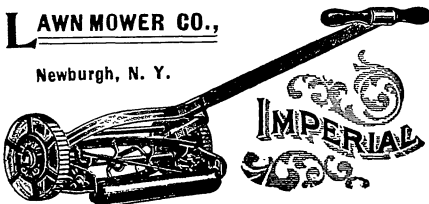
Beats
Them All.



COLDWELL

LAWN MOWER CO.,

Newburgh, N. Y.



THE BEST MOWER
ON THE MARKET.

SEND FOR OUR PAPER

"THE LAWN,"

IT IS FULL OF INFORMATION ABOUT LAWNS AND LAWN MOWERS.

THE F. & N. MFG. CO.,

Manufacturers of

Lawn Mowers, Lawn Sweepers

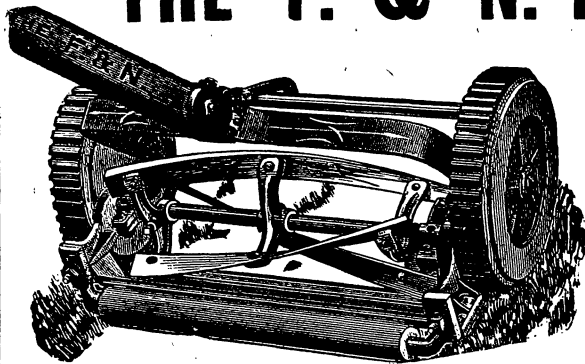
and Grass Catchers,

RICHMOND, IND., U.S.A.

The F. & N. High Grade Lawn Mower. Fully Guaranteed.

AGENTS

Woodrough & Hanchett Co.,
Chicago, Ill.
C. F. Guyon Co., Ltd., New York.
Woodrough, Mansfield & Co.,
Boston, Mass.



NEEDED IN EVERY HOUSE.

GEM VEGETABLE MASHER.

SAMPLE POSTPAID 30 CTS.

AGENTS WANTED.

F.E. KOHLER & CO. CANTON, OHIO.



MAGIC OSCILLATING CURRY COMB

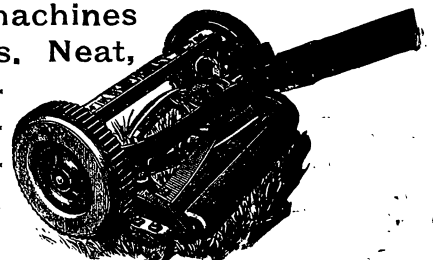


AGENTS WANTED.

SAMPLE POSTPAID 30 CTS.
WE OWN THE BOTTOM PATENTS ON SPRING COMBS.
MFRS. HARDWARE SPECIALTIES.
F.E. KOHLER & CO. CANTON, OHIO.

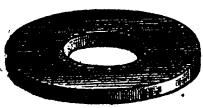
HENLEY'S LAWN MOWERS

First-class high grade machines made of the best materials. Neat, symmetrical, strong, durable and unexcelled in construction and ease of operation. Does perfect work. For prices address



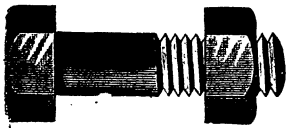
M. C. HENLEY, Sole Mfr., Richmond, Ind., U.S.A.

CARPENTER & BAYLES, Eastern Agents, 91 Chambers St., and 73 Reade St., New York City.



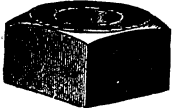
WROUGHT WASHERS

Every Washer
FLAT
With hole in
TRUE CENTER.



Packed in kegs for general trade, or in 1 and 5 lb. boxes for hardware trade.

MACHINE BOLTS.



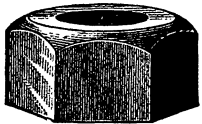
HOT PRESSED NUTS.

Highest
Standard of
EXCELLENCE.

It will pay you to correspond with us.

MILTON MANUFACTURING CO.,

MILTON, PA.



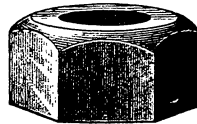
PORTCHESTER BOLT & NUT CO.

Port Chester N. Y.

MANUFACTURERS OF

BOLTS, NUTS, RIVETS and WASHERS
CHAMFERED AND TRIMMED.

SQUARE AND HEXAGON NUTS A SPECIALTY.



AMERICAN BOLT COMPANY,

Manufacturers of

BOLTS AND NUTS, COACH OR LAG SCREWS

Bridge Bolts, Car Bolts, Track Bolts, Washers, Chain Links, BUILDING BOLTS
AND IRONS OF ALL KINDS, Forgings, Bolt and Nut Machinery, &c.

JAMES MINTER, President

LOWELL, MASS.

MILES F. BRENNAN, Treas.

All Wrought Steel Center Neck Yoke.



The Strongest, Lightest, Cheapest Yoke on the Market.

Send for Price-List and Discount.

S. C. JOHNSON, - - Racine, Wis.

Manufacture To Order
SPECIALTIES & NOVELTIES, PATENTED ARTICLES,
HARDWARE GOODS ETC.. SMALL OR FINE MACHINERY.
SEND FOR CATALOGUE - CORRESPONDENCE SOLICITED
OTTO KONIGSLOW CLEVELAND, O.

**THE SCIENTIFIC
SWEEP MILL**

FOR TWO HORSES.

Grinds EAR CORN and SMALL GRAINS.

Special Cob Breaking Device and peculiar dress of Grinders. Gives BETTER WORK, MORE OF IT, WITH LESS WORK TO TEAM than others. Send for catalogue of this and

POWER MILLS.
THE FOOS MANUF'G. CO., SPRINGFIELD, OHIO.

FULLY GUARANTEED.

SENT ON TRIAL



HORACE E. BRITTON Stoughton, Mass.,

Manufacturer of the

HENRY'S PATENT COMBINATION

HAFT,

AND OTHER TOOL SPECIALTIES.

The Combination Haft contains six Brad-Awls, one Chisel, Screw Driver, Diamond Point Awl, Marking Awl, Tack Puller and Reamer. Send for Circular and Prices.



Full Set Sent Post-paid on receipt of \$1.00. (No stamps.)

K

PAYNE'S BUSINESS EDUCATOR.

600 pages, bound in cloth, \$2.

Every business man should have some knowledge of the State and general laws of the country, especially those affecting the collection of accounts, rates of interest, &c. He should be able to draw up many of the simpler papers, such as leases, contracts, &c. He should be familiar with the different forms of legal papers used in business, and, above all, he should be an easy and pleasant letter-writer. All these points are carefully treated in Payne's Business Educator.

Among the subjects specially discussed are:

Commercial Correspondence.—Over 150 models of letters are given, covering every phase of business correspondence.

Legal Forms Used in Business.—Articles of copartnership; notice of dissolution, form of assignment; short form of deed; bill of sale; power of attorney; lease; surety; will; notes—promissory, negotiable, non-negotiable, and demand; exchange—inland and foreign; acceptance; due bill; receipt; bills of lading; private cost marks, &c.

Dictionary of Mercantile Terms.—Giving a full and clear explanation of terms used in business.

Titles.—Official, military, scholastic, naval and professional titles used in the United States.

Useful Hints for Measuring Land.

Legal Rates of Interest, foreign coin, weights and measures compared with American standards.

Rules for Punctuation.

Rules of Order for deliberative assemblies and debating societies.

Interest Tables, and tables of weight and measures, &c.

How to Use a Typewriter, with lessons for practice.

Exercise in Practical Penmanship.

Laws and Forms.—An epitome of the laws of the United States and of the different States of the Union, which will be found invaluable to those who are forced to appeal to the law, as well as to that large class who wish to avoid it. The whole is alphabetically arranged, so as to make reference easy. Forms are given for a great number of legal papers, &c.

Dictionary of synonyms; marks of account; list of abbreviations; French, Spanish, Latin and Italian words and phrases, &c.

Making in all the most complete self-educator published.

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade St., New York.

WM. H. HASKEILL, PRESIDENT.

E. S. MASON, TREASURER.

D. A. HUNT, AGENT.

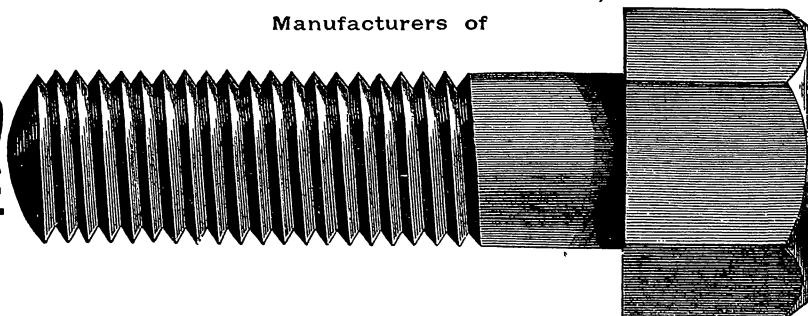
WM. H. HASKEILL CO.,
 —MANUFACTURERS OF—
GIMLET POINT COACH SCREWS  **Bolts, Cold-Punched Nuts and Washers,**
 [SUITABLE FOR MACHINERY OF ALL KINDS.]

Office and Works: 451 Main St., PAWTUCKET, R. I., U. S. A.
HENRY B. NEWHALL CO., Agents,
 105 CHAMBERS STREET, NEW YORK. - 47 PEARL STREET, BOSTON.

WORCESTER MACHINE SCREW CO., Worcester, Mass.

Manufacturers of

**SET,
CAP AND
MACHINE
SCREWS.**

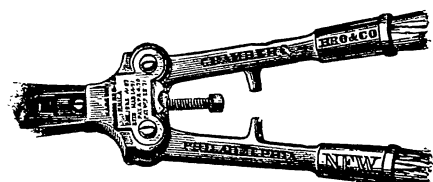


**STUDS FOR
STEAM
ENGINE,
PUMPS, &c.**

EXPANSION BOLTS.



For Fastening all Kinds of Structure to Brick and Stone Work.
 Patentee and M'r, **ISAAC CHURCH,**
 Toledo, O.



BOLT & RIVET CLIPPERS,

For cutting off the ends of Bolts and Rivets.
 Liberal discounts to the trade.

CHAMBERS BROTHERS COMPANY

52d St., BELOW LANCASTER AVE.,
 PHILADELPHIA, PA.

WM. H. JACOBUS,

No. 90 Chambers St., New York.

New York Office of

J. F. Wollensak.
 Barnes Mfg. Co.
 Penn Lock Works.
 Lorenz Bommer.
 Palmer Hdw. Mfg. Co.
 Dibble Mfg. Co.
 Wire Goods Co.
 Garritt & Beach.
 Prindle Mfg. Co.
 Tuck Mfg. Co.
 Henis Vegetable Press.
 Dille & McGuire Mfg. Co.
 National Rivet Works.
 Luffkin Rule Co.
 Wolcott Hdw. Co.
 Zimmerman's Blind Adjusters.
 Burnside Cedar Faucets.
 Fibre Head Mallet.
 Glazier's Patent Hocks.

RIVETS
 OF EVERY
 DESCRIPTION, FIRST QUALITY.

W.P. TOWNSEND & CO.
 NEW BRIGHTON, PA.

Illustrations of various rivet types: **COUNTERSUNK HEAD**, **ROUND HEAD**, **FLAT HEAD**, **STEEPLE HEAD**, **WAGON BOX HEAD**, **CONE HEAD**, **ROSE HEAD**, **TRUSS HEAD**, **BELT RIVET**, **COUNTERSUNK HEAD**.

Weights: 5lb., 6lb., 7lb., 8lb., 10lb., 12lb.

ESTABLISHED 1865.

J. H. Sternbergh & Son,

READING
 PA.

MANUFACTURERS OF BOLTS, NUTS, WASHERS, RIVETS,

Including Machine Bolts, Carriage Bolts, Bridge Bolts and Car Bolts,
THE HARVEY PATENT GRIP-THREAD TRACK BOLT, Soft Steel Bolts with Cold Rolled Thread, Bolt Ends, Turnbuckles, Sleeve Nuts, Lag Screws, Set Screws and Tap Bolts and every variety of screwed work,
BOILER, BRIDGE AND SHIP RIVETS, Square and Hexagon Nuts of all kinds and sizes, Plate Washers, Belt Lacing Machines, Rods and Irons for Bridges and Buildings, Merchant Bar Iron, etc., etc.
 Branch Establishment, **THE KANSAS CITY BOLT & NUT CO.**, Kansas City, Mo.



J. FRED WILSON, Worcester, Mass.

Metal Punching & Die Work.

Cold Punched Nuts and Washers
 for all Purposes.

SEND FOR PRICES ON
 SPECIALTIES IN LINE OF PRESS WORK.

CLASSIFIED LIST OF ADVERTISERS.

Air Chambers, Copper.

Emory, P. P. Mfg. Co., Springfield, Mass.
Springfield Brass Co., Springfield, Mass.

Air Compressors.

Norwalk Iron Works, S. Norwalk.
Rand Drill Co., 25 Park Place, N. Y.

Air Moving Machinery.

Soward & Morse, 45 Fulton, N. Y.

Aluminum.

Illinois Pure Aluminum Co., Lemont Ill.
Pittsburgh Reduction Co., Pittsburgh.
Scovill Mfg. Co., Waterbury, Conn.

Aluminum, Brass and Bronze.

Gaylord, F. L. Co., Ansonia, Conn.
Haight & Clark, Albany, N. Y.
St. Louis Bronze & Aluminum Works, St. Louis, Mo.

Analytical Chemists.

Britton, J. Blodgett Philadelphia, Pa.
Hunt, Robt. W. & Co., Chicago, Ill.
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

Anti-Friction Metals.—See Babbitt Metal.

Anvil and Vise (Combination).

Fulton Iron & Engine Works, Detroit, Mich.

Anvils.

Eagle Anvil Works, Trenton, N. J.
Wright, Peter & Sons, Dudley, Eng.

Apple Parers.

Goodell Co., Antrim, N. H.

Arms and Ammunition.

Forehand Arms Co., Worcester, Mass.
Hartley & Graham, 313 & 315 Broadway, New York.
Hulbert Bros. & Co., 23 W. 3d Street, New York.
Read, Wm. & Sons, Boston, Mass.
Stevens, J., Arms and Tool Co., Chicopee Falls, Mass.
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

Auctioneers.

Bissell, E. Son & Co., N. Y.

Axes.

Peck, A. G. & Co., Cohoes, N. Y.

Axle Grease.

Lovell, Tracy & Co., Hartford, Conn.

Axles, Springs, &c.—Manufacturers of.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Wurster, F. W. & Co., Brooklyn, N. Y.

Babbitt Metal.

Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.
Crown Smelting Co., Chester, Pa.
Hertz, T. & Son, St. Louis, Mo.
Kays, W. W. & K. M. Co., Bridgeport, Conn.
Reeves, Paul S., Philadelphia, Pa.

Bakers and Roasters.

Bronson Supply Co., Cleveland, Ohio.

Bale Ties.

Kilmer Mfg. Co., Newburg, N. Y.

Band Saw Machines.

Cross & Speirs Machine Co., Waterbury, Conn.

Barb Wire and Fence.

Consolidated Steel & Wire Co., St. Louis, Mo.
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Washburn & Moen Mfg. Co., Worcester.

Bar Iron, Manufacturers of.

Albana-Standard Iron & Steel Co., Bridgeport, Conn.
Allentown Rolling Mill, Allentown, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Montour Iron & Steel Co., Danville, Pa.
Mahoning Valley Iron Co., Youngstown, Ohio.
Sternberg, J. H. & Son, Reading, Pa.

Barrel Swing.

Leavitt Machine Co., Orange, Mass.

Bellows, Manufacturers of.

Bullock Bellows Co., Cleveland, O.
Scott, Geo. M., Chicago, Ill.

Bells.

Bevin Bros. Mfg. Co., East Hampton.

Belt Dressing.

Joe. Dixon Crucible Co., Jersey City, N. J.

Belt Fasteners.

Bristol's Mfg. Co., Waterbury, Conn.
Claffen Mfg. Co., Cleveland, Ohio.
Talcott, W. O., Providence, R. I.

Beltting, Makers of.

Alexander Bros., 413 N. 3d., Phila.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.
Main Belting Co., Philadelphia, Pa.
N. Y. Belting & Packing Co., Ltd., N. Y.
Roberts Mfg. Co., Pittsburgh, Pa.
Shultz Belting Co., St. Louis, Mo.

Bicycles.

Hingham, W. Co., Cleveland, Ohio.
Eagle Bicycle Mfg. Co., Torrington, Ct.
Culbert Bros. & Co., 26 W. 23d St., N. Y.
Lowell, Jno. P. Arms Co., Boston, Mass.
Rouse, Hazard & Co., Peoria, Ill.
Pope Mfg. Co., Boston, Mass.
Toledo Bicycle Co., Toledo, O.
Western Wheel Works, Chicago, Ill.

Bits and Braces.

Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.

Blocks, Tackle, Makers of.

Cleveland Block Co., Cleveland, O.
Fulton Iron & Engine Works, Detroit, Mich.
Toledo Block Works, Toledo, O.

Blowers.

Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Sturtevant, B. F. & Co., Boston, Mass.

Boiler Plates.

Carbon Steel Co., Pittsburgh, Pa.
Molahn, Wm. & Son, Reading, Pa.
Lukens Iron & Steel Co., Coatsville, O.
Pottstown Iron Co., Pottstown, Pa.

Sellers, Copper.

Randolph & Clowes, Waterbury, Conn.

Sellers, Steam.

Babcock & Wilcox Co., 30 Cortlandt, Edge Moor Iron Co., Wilmington.
Harrison Safety Boiler Wks., Phila., Pa.
Phoenix Iron Works Co., Meadville, Pa.
Pollock, W. B. & Co., Youngstown, O.
Southward Fdy. & Mch. Co., Phila., Pa.
Wetherill Robt. & Co., Chester, Pa.

Bolt Cutters.

Chambers Bros. Co., Philadelphia.
Howard Iron Works, Buffalo, N. Y.
Reece, Edw. F., Greenfield, Mass.
Wells Bros. Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Books.

Marine Review, Cleveland, Ohio.
Williams, David, 96-102 Reade, N. Y.
Wolcott & West, Syracuse, N. Y.

Boxes, Hdw. Shelf, &c.

Green, A. H., 22 Park Place, N. Y.
Jones, Jesse & Co., Philadelphia, Pa.

Box Straps and Corners.

Buffalo Specialty Mfg. Co., Buffalo, N. Y.

Brake Shoes.

Sargent Co., Chicago, Ill.

Brass, Manufacturers of.

Ansonia Brass & Copper Co., N. Y.
Daval, John & Sons, 100 John, N. Y.
Holmes, Booth & Hayden, N. Y.
Flume & Atwood Mfg. Co., N. Y.
Randolph & Clowes, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Waterbury Brass Co., 296 B'way, N. Y.

Brass Butt Hinges.

Tiebout, W. & J., 16 & 18 Chambers.

Brass Foundries.

Best, Fox & Co., Pittsburgh, Pa.
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.
Cramp, Wm. & Sons, 3 & E. B. Co., Philadelphia, Pa.
Emory, P. P. Mfg. Co., Springfield, Mass.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Haight & Clark, Albany, N. Y.
Keys, W. W. & R. M. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Phila., Pa.
Reeves, Paul S., Philadelphia, Pa.

Brass Goods.

Brass Goods Mfg. Co., 88 Chambers.

Brass Builders.

Berlin Iron Bridge Co., East Berlin, Ct.
Boston Bridge Works, Boston, Mass.
Wrought Iron Bridge Co., Canton, O.

Bronze (Tobin).

Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.

Builders' Hardware.

Deitz, A. E., 97 Chambers St., N. Y.
Reading Haw. Co., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.

Burchers' Steels.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.
Hoffman, C. & A., Philadelphia, Pa.

Butcher and Shoe Knives, Manufacturers of.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.
Goodell Co., Antrim, N. H.
Wilson, John, Sheffield, England.

Butts and Hinges.

McKinney Mfg. Co., Allegheny, Pa.
Sabin Machine Co., Montpelier, Vt.
Stanley Works, New Britain, Conn.
Tiebout, W. & J., 16 Chambers, N. Y.

Cutters and Dividers.

J. Stevens Arms and Tool Co., Chicopee Falls, Mass.
Starrett, L. S., Athol, Mass.

Car Axles.

Roberts, A. & P. & Co., Phila.

Carboy Stands.

Hillebrand & Wolf, Philadelphia, Pa.

Car Wheels.

Whitney, A. & Sons, Phila.

Carriage Hardware, Makers of.

Covert's Saddlery Works, Farmer, N. Y.
Eccles, Richard, Auburn, N. Y.
McKinnon Dash & Haw. Co., Ltd., Buffalo, N. Y.
Scranton Forging Co., Scranton, Pa.
Smith, H. D. & Co., Plantsville, Conn.
Wilcox & Howe Co., Birmingham, Conn.

Cartridge Reloading Tools.

Ideal Mfg. Co., New Haven, Conn.

Casters, Wheel, &c.

Clark, G. P., Windsor Locks, Conn.

Castings, Iron and Steel.

Ames Sword Co., Chicopee, Mass.
Arcade Malleable Iron Co., Worcester, Mass.
Booth, The Lloyd, Co., Youngstown, O.
Burgess & Loxley, Buffalo, N. Y.
The Hurr & Houston Co., Brooklyn, N. Y.
Cambria Steel—Cambria Iron Co., Johnstown, Pa.
Cheney, S. & Son, Manlius, N. Y.
Chester Steel Casting Co., Phila.
Chrome Steel Works, Brooklyn, N. Y.
Dayton Malleable Iron Co., Dayton, O.
Etie & Henger Mfg. Co., St. Louis, Mo.
Eureka Cast Steel Co., Chester, Pa.
Flagg, Stanley G. & Co., Phila.
Garland Foundry Co., Cleveland, O.
Haight & Clark, Albany, N. Y.
Hammer & Co., Branford, Conn.
Herrick, J. A., 284 Pearl St., N. Y.
Johnson Foundry Co., Johnstown, Pa.
Johnson, I. G. & Co., Spuyten Duyvil.
Mahoning Fdry. & Mch. Co., Danville, Pa.
Palmer & De Mooy, Cleveland, O.
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Peerless Fdry Co., Philadelphia, Pa.
Sargent Co., Chicago, Ill.
Seasons Foundry Co., Bristol, Conn.
Spencer's, I. S., Sons, Guilford, Conn.
Standard Fdy. & Mfg. Co., Cleveland, O.
Standard Steel Casting Co., Thurlow, Pa.
Taylor Iron & Steel Co., High Bridge, N. J.
Totten & Hogg Iron & Steel Fdry Co., Philadelphia, Pa.
Troutman, I. G. & Co., Spuyten Duyvil.
Trenton Mal. Iron Co., Trenton, N. J.
Union Mfg. Co., 103 Chambers St., N. Y.
West Coxssackie Iron Fdry, Coxssackie, N. Y.
Wetherill, Robt. & Co., Chester, Pa.

Chains.

Bradlee & Co., Philadelphia.
Bridgeport Chain Co., Bridgeport, Conn.
Link-Belt Engineering Co., Phila., Pa.
McKay, Jas. & Co., Pittsburgh, Pa.

Chimneys.

Phila. Engineering Works, Phila., Pa.

Chisels, Manufacturers of.

Buck Bros., Millbury, Mass.
White, L. & I. J. Co., Buffalo, N. Y.

Chucks.

Cushman Chuck Co., Hartford, Conn.
Smith & Egge Mfg. Co., Bridgeport.
Skinner Chuck Co., New Britain, Conn.
Union Mfg. Co., 103 Chambers, N. Y.
Whiton, D. E. Mach. Co., New London, Conn.

Clamps.

Hammer & Co., Branford, Conn.
Le Count, C. W., So. Norwalk, Conn.

Clipping Machines.

Hotchkiss, E. S., Bridgeport, Conn.
McCooy, Jos. F. & Co., 26 Warren St.

Coal.

Barns, C. K. & Co., Philadelphia, Pa.
Wister, Francis, Philadelphia, Pa.

Coke.

Barns, C. K. & Co., Philadelphia, Pa.
Houston, C. B. & Co., Philadelphia, Pa.
Rainey, W. J., Cleveland, O.
Sibell, Geo. H. & Co., Chicago, Ill.
Wister, Francis, Philadelphia, Pa.

Collections.

Hardware Board of Trade (Limited) 4 and 6 Warren, N. Y.

Condensers.

Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

Conveying Machinery.

Brown, Holsting & Conveying Machine Co., Cleveland, Ohio.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.

Copper.

Ames Sword Co., Chicopee, Mass.
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
New Haven Copper Co., 294 Pearl, N. Y.
Randolph & Clowes, Waterbury, Conn.
Wister, Francis, Philadelphia, Pa.

Coppersmiths.

Emory, P. P. Mfg. Co., Springfield, Mass.

Cordage.

Samson Cordage Works, Boston, Mass.

Cork Screws.

Williamson, C. T. Wire Novelty Co Newark, N. J.

Corn Huskers.

Hall & Ross Husking Glove Co., Chicago, Ill.
Moore & Wickert, Green River, Ohio.

Corrugated Furnaces.

Continental Iron Wks, Brooklyn, N. Y.

Corrugated Iron.

Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Moseley Iron Bridge & Roof Co., 5 Day, N. Y.

Counting Machines.

Durant, W. N., Milwaukee, Wis.
Osborn, G. Edw. & Co., New Haven, Ct.

Coupling.

Almond, T. R., Brooklyn, N. Y.

Coverings, Boiler and Pipe.

Johns, H. W. Mfg. Co., 87 Maiden Lane.

Cranes.

Detroit Foundry Equipment Co., Detroit, Mich.
Maris & Beekley Philadelphia, Pa.
Ridgway, Craig & Sons, Coatesville, Pa.
Sellers, Wm. & Co., Inc., Phila., Pa.
Yale & Towne Mfg. Co., Stamford, Conn.

Cupolas, Hot-Blast.

Byram & Co., Detroit, Mich.
Collins, Victor, Detroit, Mich.
Detroit Fdry. Equipment Co., Detroit, Mich.

Curry Combs.

Konler, F. E. & Co., Canton, O.

Cutlery Cases.

Torrey, J. R. & Co., Worcester, Mass.

Cutlery, Importers of.

Field, Alfred & Co., 93 Chambers St., New York.
Gurney, Fred B., 118 Chambers St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.

Cutlery, Manufacturers of.

Cutley, J. & Bro., 6 Warren St., N. Y.
Dane, Stoddard & Kendall, Boston, Mass.
Electric Cutlery Co., 113 Chambers, N. Y.
Goodell Co., Antrim, N. H.
Northampton Cutlery Co., Northampton, Mass.
Schmactenberg Bros., 98 Chambers Street, N. Y.
Wilson, John, Sheffield, England.

Cutting-off Tools.

Hurley Bros., Hartford, Conn.

Dies.

Wilson, J. Fred, Worcester, Mass.

Dog Collars.

Chapman Mfg. Co., Meriden, Conn.

Door Bells.

Graham, Jno. H. & Co., 113 Chambers St., N. Y.

Door Knobs.

Bardsley, J., 149 & 151 Baxter St., N. Y.

Drawing Instruments.

Keuffel & Esser Co., 127 Fulton St., N. Y.

Drilling Machines.

Bickford Drill & Tool Co., Cinn., Ohio.
Buffalo Forge Co., Buffalo, N. Y.
Burnham, Geo. Co., Worcester, Mass.
Champion Blower and Forge Co., Lancaster, Pa.
Colburn, A. M., New Haven, Conn.
Dallett, Thos. H. & Co., Philadelphia, Pa.
Dwight Slate Machine Co., Hartford, Conn.
Halsey, Jas. T., Philadelphia, Pa.
Hamilton Mch. Tool Co., Hamilton, O.
Norton & Jones Machine Tool Works, Plainville, Conn.
Quint, A. D., Hartford, Conn.
Sellers, Wm. & Co., Inc., Phila., Pa.
Sigourney Tool Co., Hartford, Conn.
Silver Mfg. Co., Salem, O.
Smith Friction Drill & Tool Co., Boston, Mass.

Drop Forgings.

Bellevue Mach. Co., New Haven, Conn.
Billings & Spencer Co., Hartford, Conn.
Boone, W. C. Mfg. Co., Boonton, N. J.
Eccles, Richard, Auburn, N. Y.
Herrbrand Co., Framont, O.
Herrill Bros., Brooklyn, N. Y.
Miner & Peck Mfg. Co., New Haven, Ct.
Phila. Drop Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Spies, J. C. & Co., Worcester, Mass.
Williams, J. H. & Co., Brooklyn, N. Y.
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.
Wyman & Gordon, Worcester, Mass.

Drop Presses.

Silas E. W. Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Miner & Peck Mfg. Co., New Haven, Conn.
Stiles & Parker Press Co., Brooklyn, N. Y.
Vulcan Iron Works, Chicago, Ill.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Dumb Waiters.

Storm Mfg. Co., Newark, N. J.

Dust Beaters.

Peabody & Parks, Troy, N. Y.

Dynamite.

New York Powder Co., 62 Liberty St. N. Y.

Dynamics.

C. & C. Electric Motor Co., 402 and 404 Greenwich St., N. Y.
Lovell Mfg. Co., Ltd., Erie, Pa.
Zucker & Levett Chemical Co., 10 1/2 14 Grand St., N. Y.

Edge Tools. Makers of.

Suck Bros., Millbury, Mass.
Butcher, W. & S., 135 Duane St., N. Y.
Buffalo Edge Tool Wks., Buffalo, N. Y.
Plumb, Fayette R., Philadelphia, Pa.
White, L. & I. J. Co., Buffalo, N. Y.

Egg Beaters.

North Bros. Mfg. Co., Philadelphia.

Electric Bells and Supplies.

Ostrander, W. R. & Co., 204 Fulton St., New York
Wollensak, J. F., Chicago, Ill.

Electric Dynamo Machines.

Eddy Electric Mfg. Co., Windsor, Conn.

Electro-Platers.

Boardman, L. & Son, East Haddam, Ct.

Elevators. Makers of.

Link-Belt Engineering Co., Phila., Pa.
Morse, Williams & Co., Phila., Pa.
Salem Fdry & Mch. Co., Salem, Mass.

Emery and Emery Wheels.

Bell, Geo. E., 36 John St., N. Y.
Grant Corundum Wheel Mfg. Co., Worcester, Mass.
N. Y. Belting & Packing Co., Ltd., N. Y.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.

Enamels.

Nubian Iron Enamel Co., Cragin, Ill.

Engineers and Contractors.

Alken Henry, Pittsburgh, Pa.
Artificial Gas Engineering Co., Pittsburgh, Pa.
Herrick, J. A., 284 Pearl St., N. Y.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
Lean, D. R., Co., Pittsburgh, Pa.
McClure, Amiel & Co., Pittsburgh, Pa.
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.
Roberts, Frank C., Philadelphia, Pa.
Smythe, S. R. Co., Incorporated Pitts-
burgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
Wetherow, Jas. P. Co., Pittsburgh, Pa.

Engines, Gas.

Otto Gas Engine Works, Phila., Pa.
Rollason Gas Engine, Havemayer Bldg., N. Y.
Bass Foundry & Machine Works, Ft. Wayne, Ind.
Buckeye Engine Co., Salem, O.
Erie Engine Wks., Erie, Pa.
Harrisburg Fdy. & Machine Works, Harrisburg, Pa.
Norwalk Iron Works Co., So. Norwalk, Conn.

Phila. Engineering Works, Phila., Pa.
Phoenix Iron Wks. Co., Meadville, Pa.
Shipman Engine Co., Boston, Mass.
Southward Foundry and Machine Co., Phila., Pa.
Tod, William & Co., Youngstown, O.
Wetherill, Robt. & Co., Chester, Pa.

Exhaust Tumblers.

Sweetser, W. A., Brockton, Mass.

Expansion Bolts.

Boone, W. C. Mfg. Co., Boonton, N. J.
Church, Isaac, Toledo, O.

Faucets, Self-Measuring

Lane Bros., Poughkeepsie, N. Y.

Faucets, Wooden. Makers of.

Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
John Sommer's Son, Newark, N. J.

Feed-Water Heaters.

Davis, I. B. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
National Pipe Bending Co., New Haven, Conn.
Webster, Warren & Co., Camden, N. J.
Whitlock Coll Pipe Co., Elmwood, Conn.

Fencing, Iron and Wire.

Sarnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Clinton Wire Cloth Co., Clinton, Mass.
DeKalb Fence Co., DeKalb, Ill.
Gilbert & Bennett Mfg. Co., 42 Cliff St., Hartman Mfg. Co., Ellwood City, Pa.
Kilmer Mfg. Co., Newburgh, N. Y.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
Bellance Wire & Iron Wks., Milwaukee

Files, Importers of

Moss, F. W., 80 John, N. Y.

Files and Raps, Manufacturers of

Sanker & White, Troy, N. Y.
Barnett, G. & H., 41 & 43 Richmond, Phila.
Butcher, W. & S., 135 Duane St., N. Y.
McCaffrey File Co., Philadelphia.
Nicholson File Co., Providence, R. I.

Fire Brick, Makers of.

Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B. & Sons, foot E. Houston, St.
McLeod & Henry Co., Troy, N. Y.
Maurer, H. & Son, 420 E. 23d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Valentine, M. D. & Bro., Woodbridge.

Fire Sets.

Troy Nickel Works, Troy, N. Y.

Fishing Tackle.

Dame, Stoddard & Kendall, Boston, Mass.

Flint and Emery Paper.

Baeder, Adamson & Co., Phila., Pa.

Flour Sifters.

Sills, W. H., 83 Lake St., Chicago, Ill.

Fodder Cutters.

Silver Mfg. Co., Salem, O.

Forges, Portable, &c.

Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Portable Forge Co., Lansing-
burg, N. Y.
Foss Mfg. Co., Springfield, Ohio.
Sturtevant, B. K. Co., Boston, Mass.

Forgings, Iron and Steel.

Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel—Cambria Iron Co., Johnstown, Pa.
Scranton Forging Co., Scranton, Pa.

Foundry Facings.

Paxson, J. W. & Co., Phila.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.

Foundry Middles.

Estey, W. S., 65 Fulton, N. Y.

Foundry Supplies.

Colliau, Victor, Detroit, Mich.
S. Obermayer Co., Cincinnati, O.
Paxson, J. W. & Co., Philadelphia.
Smith, J. D. Fdy. Supply Co., Cinn., O.

Friction Clutches.

Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.

Friction Cone.

Evans Friction Cone Co., Boston, Mass.

Fruit Presses.

Enterprise Mfg. Co., Philadelphia, Pa.

Furnaces, Foundry.

Byram & Co., Detroit, Mich.

Gas Producers.

Wood, R. D. & Co., Philadelphia, Pa.

Gas & Steam Fitters' Supplies.

Pancoast, Henry B. & Co., Phila., Pa.

Gauge, Rolling Mill.

Haines Gauge Co., Philadelphia, Pa.

Gear Cutters.

D. E. Whiton Mach. Co., New London, Conn.

Gears.

Boston Gear Works, Boston, Mass.
New Process Raw Hide Co., Syracuse, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.

Glass Boards.

Canton Saw Co., Canton, O.

Glass Cutters.

Monroe, S. G., Bristol, Conn.

Glass Tubes.

Ashcroft Mfg. Co., 111 Liberty St., N. Y.

Glue.

Baeder, Adamson & Co., Phila., Pa.
Russia Cement Co., Gloucester, Mass.

Grass Catchers.

Supplee Hardware Co., Phila., Pa.

Grinding Mills.

Foss Mfg. Co., Springfield, O.
Norton Emery Wheel Co., Worcester, Mass.
Washburn Shops, Worcester, Mass.

Grindstone Dressing Machinery

Blake & Johnson, Waterbury, Conn.

Grindstones.

Cleveland Stone Co., Cleveland, O.

Gunpowder, Makers of.

Lafin & Rand Powder Co., 29 Murray St., N. Y.

Hand Carts.

Lansing Wheelbarrow Co., Lansing, Mich.

Handles.

New Process Raw Hide Co., Syracuse, N. Y.
New York Mallet and Handle Wks., 455 E. Houston St., N. Y.

Hangers, Door.

Chicago Spring Butt Co., Chicago, Ill.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.

Hardware Comm'n Merchants.

Doscher, Martin, 88 Chambers, N. Y.
Field, Alfred & Co., 93 Chambers St., N. Y.
Graham, John H. & Co., 111 Chambers St., New York.
Jacobus, W. H., 90 Chambers, N. Y.

Hardware Manufacturers.

Kotchkiss, E. S., Bridgeport, Conn.
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.

Hardware Mfrs. Agents.

Bingham, W. Co., Cleveland, O.
Graham, John H. & Co., 113 Chambers, N. Y.
McCoy, Jos. F. Co., 28 Warren St., N. Y.
Sticks Sweet & Lyon, 35 Barclay, N. Y.
Underhill, Clinch & Co., 94 Chambers St., N. Y.

Hardware Specialties.

Aome Shear Co., Bridgeport, Conn.
Belden Machine Co., New Haven, Conn.
Empire Portable Forge Co., Lansing-
burg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Haines & Zimmerman, Phila., Pa.
Hart, H. C. Mfg. Co., Detroit, Mich.
Henn, A. S. & Co., New Haven, Conn.
Johnson, S. O., Racine, Wis.
Knapp & Cowles Mfg. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Weitland, Chas., 149 Chambers St., N. Y.
Wilson, J. Fred, Worcester, Mass.
Wire Goods Co., Worcester, Mass.
Underhill, Clinch & Co., 94 Chambers Street, N. Y.

Hardware, Yacht and Ship.

Ferdinand, L. W. & Co., Boston, Mass.

Harness Snaps.

Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.
Fitch, W. E. T., New Haven, Conn.

Hay Knives.

Holt, Hiram, Co., E. Wilton, Me.

Hoisting Machines.

Box, Alfred & Co., 314 Green, Phila.
Jarrow Hoisting & Conveying Mch. Co., Cleveland, Ohio.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E. Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 98 Liberty, N. Y.
Maris & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Spiegel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.

Hollow Ware.

Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
Stuart & Peterson Co., Phila., Pa.

Hollow Ware, Aluminum.

Illinois Pure Aluminum Co., Lemont, Ill.

Horse and Barbers' Clippers.

Hotehkiss, E. S., Bridgeport, Conn.

Horse Nails, Makers of.

National Horse Nail Co., Vergennes, Vt.

Horse and Mule Shoes, Makers of.

Bryden Horse Shoe Co., Catsaugua, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence, R. I.
Shoenberger & Co., Pittsburgh, Pa.
Standard Horse Shoe Co., Boston, Mass.

Hose.

Cleveland Rubber Co., Cleveland, O.
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.

Hydrants, &c.

McLean, John, 296 & 298 Monroe, N. Y.

Hydraulic Jacks.

Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.

Ice-Cream Freezers.

North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
White Mountain Freezer Co., Nashua, N. H.

Ice Shavers.

Enterprise Mfg. Co., Philadelphia, Pa.

Injectors.

Bynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., New York.

Insurance, Boiler.

Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Iron and Steel, Swedish.

Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.

Iron Commission Brokers.

Corning, Edw. & Co., 39 B'way, N. Y.
Cotton, Bradley & Co., Philadelphia.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levi, Henry & Co., Philadelphia.
Keely, Jerome & Co., Philadelphia.
Lee, J. Tatnall & Co., Philadelphia.
Mohr, J., 480 Walnut, Philadelphia.
Mann, E. R. & Co., Philadelphia.
Pilling & Crane, Philadelphia, Pa.
Sibell, Geo. H. & Co., Chicago, Ill.
Wister, L. & R. & Co., Phila., Pa.

Iron Ore.

Naylor & Co., 45 Wall, N. Y.
Pikanda, Brown & Co., Chicago, Ill.
Fullan, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.

Iron, Merchants.

Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Busenius & Cunliffe, Philadelphia.
Corning Edw. & Co., 29 B'way, N. Y.
Cox, Justus, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 448 West St., N. Y.
Navier & Co., 45 Wall St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pikanda, Brown & Co., Chicago, Ill.
Pierson & Co., 29 Broadway, N. Y.
Richards, D. W. & Co., 88 Manhatn St., N. Y.
Thomson, W. H. & Co., Phila., Pa.
Walace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.

Iron, Importers.

Abbott Wheelock & Co., N. Y. and Boston
Lundberg, Gustaf, Boston, Mass.

Iron, Sheet, Manufacturers of.

Cambridge Iron & Steel Co., Cambridge, Ohio
W. Dewees Wood Co., Lim., McKees-
port, Pa.

Ironwork, Ornamental.

Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.

Keys.

Wollensak, J. F., Chicago, Ill.

Ladies.

Detroit Fdy. Equipment Co., Detroit, Mich.

Lamp Stoves.

Glazier Stove Co., Chelsea, Mich.

Lamps.

Standard Lighting Co., Cleveland, O.

Lanterns.

Dietz, R. E., Co., 60 Light St., N. Y.
Ohio Lantern Co., Tiffin, Ohio.
Steam Gauge & Lantern Co., Syracuse, N. Y.

Lathes.

Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Lathing, Wire.

Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.

Laundry Machines.

Johnson, S. C., Racine, Wis.

Lawn Mowers.

Chadborn & Coldwell Mfg. Co., New-
burg, N. Y.
Coldwell Lawn Mower Co., Newburg, N. Y.
F. & N. Mfg. Co., Richmond, Ind.
Hensley, M. C., Richmond, Ind.
Lape, W. E., Syracuse, N. Y.
Mast, Foss & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supplee Hdw. Co., Phila., Pa.

Lawn Rakes.

Schaeffer & Co., Dayton, Ohio.
Syracuse Specialty Mfg. Co., Syracuse, N. Y.

Lawn Sprinklers.

Ette & Henger Mfg. Co., St. Louis.

McGowan, John H. Co., Cincinnati, O.

Lawn Sweepers.

Lape, W. E., Syracuse, N. Y.

Lemon Squeezers.

Ripley Mfg. Co., Unionville, Conn.

Letters and Figures, Metallic

White, A. A. & Co., Providence, R. I.

Letters, Paper.

Tablet & Ticket Co., Chicago, Ill.

Levels.

Davis & Cook, Watertown, N. Y.
Richardson, C. E., & Son, Athol, Mass.

Locks & Knobs, Manufacturers of

Dietz, A. E., 97 Chambers, N. Y.

Keyless Lock Co., Chicago, Ill.

Reading Hdw. Co., Reading, Pa.

Smith & Egge Mfg. Co., Bridgeport, Conn.

Yale & Towne Mfg. Co., Stamford, Conn.

Machinery.

Am. Tool Works, Cleveland, Ohio.
Barnes, W. F. & John, Rockford, Ill.
Bement, Miles & Co., Philadelphia, Pa.
Bigelow, C. E., 45 Dey, N. Y.
Bignall & Keeler Mfg. Co., St. Louis.
Birmingham Iron Foundry, Birmingham, Conn.

Bliss, E. W. Co., Brooklyn, N. Y.
Bogert, Jno. L., Flushing, N. Y.
Briggs, Marvin, 13 Broadway, N. Y.
Carlin's Sons, Thos., Allegheny, Pa.
Cinn. Milling Mch. Co., Cincinnati, Ohio.

Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
Coulter & McKensie Mch. Co., Bridgeport, Conn.
Cruikshank, D. B., Providence, R. I.
Detrick & Harvey Mch. Co., Baltimore, Md.

Fitchburg Mch. Works, Fitchburg, Mass.
Garvin Mch. Co., Lighthouse & Canal Sts.
Gould & Eberhart, Newark, N. Y.
Hamilton Mch. Tool Co., Hamilton, O.
Harrington, E. Son & Co., Phila., Pa.

Henderson, A. L., Wilmington, Del.
Hendev Machine Co., Torrington, Ct.
Hill, Clarke & Co., Boston, Mass.
Ingersoll Milling Machine Co., Rockford, Ill.

Johnson, Israel H., Jr., & Co., Phila.
Jones & Lamson Mch. Co., Springfield, Vt.
Lodge & Shipley Mch. Tool Works, Cincinnati, O.

Lovegrove & Co., Philadelphia, Pa.
McCabe, J. J., 68 Cortlandt, N. Y.
Mechanists Supply Co., Rochester, N. Y.
Manville, E. J. Mch. Co., Waterbury, Conn.

Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
New York Mach'y Depot, N. Y.
Niles Tool Wks., 188 Liberty St., N. Y.

Place, Geo., 120 Broadway, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.

Scranton Tool & Supply Co., N. Y.
Scranton Supply & Mch'y. Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons L. F., Philadelphia, Pa.

Steeple, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., Ltd., Phila.
Toomey, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.

Wilson, W. A., Rochester, N. Y.
Machinery for Hardware Manufacture.
Adt, Jno. & Son, New Haven, Conn.

Machine Knives.
Loring Coes & Co., Worcester, Mass.
Loyd, John, 558-562 Water St., N. Y.

Machine Tools.—See machinery.
Machine Work.
Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.
Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.

Machinists' Tools and Supplies.
King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Inc., Phila.

Mallets.
N. Y. Mallet & Handle Works, N. Y.
Mangles.
Johnson, S. C., Racine, Wis.

Manufacturing Sites.
Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.

Measuring Tapes.
Keuffel & Esser Co., 127 Fulton St., N. Y.
Lufkin Rule Co., Saginaw, Mich.

Meat Cutters.
Enterprise Mfg. Co., Philadelphia, Pa.
Mechanical Instruction.
Correspondence School of Mechanics, Scranton, Pa.

Metals.
Fearing, Wm. S., 100 Chambers, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
Naylor & Co., 45 Wall, N. Y.

Metal Brokers.
American Metal Co., N. Y.
Metalurgists.
Britton, J., Blodgett, Phila.

Milling Machines.
Cin. Milling Mch. Co., Cincinnati, Ohio.
Ingersoll Milling Machine Co., Rockford, Ill.

Mining Knives.
Palmer Edw. Mfg. Co., Troy, N. Y.
Mine Lamps.
Darby, Edw. & Sons, Phila. Pa.
Leonard, B. E., Scranton, Pa.
Leonard, T. F., Scranton, Pa.

Mining Screens.
Harrington & King Perforating Co., Chicago, Ill.
Howard & Morse, 45 Fulton, N. Y.
Mirrors.
Rice, C. F., Chicago, Ill.

Molding Sand.
Obermayer, S. Co., Cincinnati, O.
Paxson, J. W. & Co., Phila.
Motors, Water and Electric.
O. & C. Electric Motor Co., 402 & 404 Greenwich St., N. Y.
Dallett, Thos. H. & Co., Phila., Pa.

Roll Machinery.
Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nails (Out) and Spikes.

Borden & Lovell, 70 West, N. Y.
Lumberland Nail & Iron Co., Phila.
Oxford Iron Co., 61 Washington, N. Y.
Pottstown Iron Co., Pottstown, Pa.
Riverside Iron Wks., Wheeling, W. Va.

Neck Yokes.
Johnson, S. C., Racine, Wis.
Nickel Platers' Supplies.
Eddy Electric Mfg. Co., Windsor, Conn.
Zucker & Levett Chemical Company, 10 to 14 Grand St., N. Y.

Norway Shapes, Rollers of.
Rowland, William & Harvey, Frankford, Philadelphia

Nut Machines.
Dunham Nut Mch. Co., Unionville, Ct.
Nuts, Bolts, &c., Makers of.
American Bolt Co., Lowell, Mass.

American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Baskell, Wm. H. Co., Pawtucket, R. I.
Mt. Carmel Bolt Co., Mt. Carmel, Conn.

Fort Chester Bolt and Nut Co., Chester, N. Y.
Russell, Hurdall & Ward, Port Chester, N. Y.
Sternbergh, J. E. & Son, Reading, Pa.
Wilson, Fred, Worcester, Mass.

Wm. H. Haskell Co., Pawtucket, R. I.
Oilers.
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

Oil Stones.
Pike Mfg. Co., Pike Station, N. H.
Oil Stoves.
Glazier Stove Co., Chelsea, Mich.

Ores.
Wister, Francis, Philadelphia, Pa.
Ox Shoes.
Scranton Forging Co., Scranton, Pa.

Packing.
Billington, Jas. H. & Co., Phila., Pa.
Morison, Robt., St. Louis, Mo.
N. Y. Beltine & Packing Co. Ltd., N. Y.

Padlocks.
Ames Sword Co., Chicopee, Mass.
Fralin, E. T., Lancaster, Pa.
Hillebrand & Wolf, Phila., Pa.
Miller Lock Co., Philadelphia, Pa.

Paint.
Dixon, Jos. Crucible Co., Jersey City, N. J.
Garry Iron & Steel Roofing Co., Cleveland, O.

Paint Burners.
Dangler Stove & Mfg. Co., Cleveland, O.
Paint Cans.
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

Patent Solicitors.
Howson & Howson, Phila. & Wash'gton.
Jenner, H. W. T., Washington, D. C.
Stocking, E. B., Washington, D. C.

Perforated Metal.
Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Phosphor Bronze.
Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia.

Phosphor Tin.
Crescent Phosphorized Metal Co., Philadelphia, Pa.
Crosby Steam Gate & Valve Co., Boston, Mass.
Halk & Naumann, 516 Pearl, N. Y.

Picks and Mattocks.
Plumb, Fayette R., Philadelphia, Pa.
Pig Iron.
Houston, C. B. & Co., Philadelphia, Pa.

Mann, Edwin R., Philadelphia, Pa.
Montour Iron & Steel Co., Danville, Pa.
Naylor & Co., 45 Wall, N. Y.
Pickands, Brown & Co., Chicago, Ill.

Pilling & Crane, Philadelphia, Pa.
Samuel, Frank, Philadelphia, Pa.
Pig Iron Storage.
Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

Pile Drivers.
Vulcan Iron Wks., Chicago, Ill.
Pipe Bent.
National Pipe Bending Co., New Haven

Pipe Cutting and Threading Machines.
Bignall & Keeler Mfg. Co., St. Louis, Mo.
Merrill Mfg. Co., Toledo, O.
Pancoast Henry B. & Co., Philadelphia, Pa.

Saunders Sons, D., Yonkers, N. Y.
Pipe Grips.
Frentiss Vise Co., 44 Barclay, N. Y.
Pipes, Fittings, &c., Makers of.
McNab & Harlin Mfg. Co., N. Y.

Pipe, Water and Gas. Makers of.
Lumberland Nail & Iron Co., Phila., Pa.
Donaldson Iron Co., Emmaus, Pa.
Riverside Iron Works, Wheeling, W.

Wood, R. D. & Co., Philadelphia, Pa.
Plane Irons, Manufacturers of.
Buck Bros., Millbury, Mass.
Planes, Manufacturers of.
Stanley Rule & Level Co., N. Y.

Plate Bending Rolls.
Schneekloth, H. A., 530 W. 28th St., N. Y.

Place, Iron and Steel, Mfrs of.
Ema-Standard Iron & Steel Co., Bridgeport, O.

Mahoning Valley Iron Co., Youngstown, Ohio.
McLean Co., Pittsburgh, Pa.
McLain & Sons, Reading, Pa.
Pottstown Iron Co., Pottstown, Pa.
Pottville Iron & Steel Co., Pottville, Pa.

Singer, Nimick & Co., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Wellman Iron & Steel Co., Thurlow, Pa.
Wood Alan Co., Philadelphia.

Plating, Nickel, Brass and Silver.
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

Pokers and Lifters.
Troy Nickel Works, Troy, N. Y.
Polishing Machines.
Watson & Stillman, 204 E. 43d, N. Y.

Polishing Wheel.
La Massena, C. E. & Co., Newark, N. J.
Post Hole Diggers.
Kohler, F. E. & Co., Canton, O.

Wister, L. R. & Co., Philadelphia, Pa.
Poultry Nettings.
Barnum, E. T., Detroit, Mich.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.

N. J. Wire Cloth Co., Trenton, N. J.
"Silver Finish."
Tyler Wire Wks. Co., W. S., Cleveland, O.

Wright & Colton Wire Cloth Co., Worcester, Mass.
Powder.
Lafin & Rand Powder Co., 29 Murray

New York Powder Co., 62 Liberty St., N. Y.
Power Hack Saws.
Millers Falls Co., 93 Reade St., N. Y.

Powder Hammers.
Belden Mch. Co., New Haven, Conn.
Dienelt & Eisenhardt, Philadelphia.
Jenkins & Lingie, Bellefonte, Pa.

Presses, Dies, &c.
E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Stark Mch. & Tool Co., Buffalo, N. Y.

Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Mch. Co., Waterbury, Conn.
Presses, Power, Makers of.
Bliss, E. W. Co., Brooklyn, N. Y.

Manville, E. J. Mch. Co., Waterbury, Ct.
Merriman, A. H., Meriden.
Stark Mch. & Tool Co., Buffalo, N. Y.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Pulleys.
Keystone Clutch Mch. Wks., Phila., Pa.
Pulverizing Mill.
Bradley Fertilizer Co., Boston, Mass.

Pumping Machinery.
Coulter & McKensie Mch. Co., Bridgeport, Conn.
Dean Bros. Steam Pump Works, Indianapolis, Ind.

Hooker-Colville Steam Pump Co., Chicago, Ill.
McCaw, J. H. & Co., Cincinnati, O.
Maslin, J. & Son, Jersey City, N. J.
Norwalk Iron Wks. Co., So. Norwalk, Conn.

Southark Fdy. & Mch. Co., Phila., Pa.
Valley Pump Wks., Easthampton, Mass.
Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Pumps, Makers of.
Bellevue Pump Co., Bellevue, Iowa.
Deming Co., Salem, U.
Douglas, W. & B., Middletown, Conn.

East Foot & Co., Springfield, O.
Myers, F. E. & Bro., Ashland, O.
Punches and Shears, Hand and Power.
E. W. Bliss Co., Brooklyn, N. Y.

Cockburn Barrow & Mch. Co., Jersey City, N. J.
Crosby, G. A. & Co., Chicago, Ill.
Henderson, A. L., Wilmington, Del.
Schneekloth, H. A., 530 W. 28th St., N. Y.

Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.

Watson & Stillman, 204 E. 43d, N. Y.
Rails, Old and New.
Perry, W. H. & Co., Providence, R. I.
Schwarzenberg Bros. & Co., Cleveland, O.

Rat and Mouse Traps.
Burditt & Williams, Boston, Mass.
Estey, W. S., 65 Fulton, N. Y.
Ripley Mfg. Co., Unionville, Conn.

Razors.
Butcher, W. & S., 135 Duane St., N. Y.
Curley, J. & Bro., 6 Warren St., N. Y.
Elect. Cutter Co., New York, N. Y.
Schmitt, E. Lothar, 92 Reade St., N. Y.

J. R. Torrey Razor Co., Worcester, Mass.
Reels.
Hendryx, A. B. Co., New Haven, Conn.

Refrigerator Door Fasteners.
Conroy, P. J. & Co., Philadelphia.
Rivets.
Blake & Johnson, Waterbury, Conn.

Boyce Rivet Co., Muncie, Ind.
Burden Iron Co., Tr. Y., N. Y.
Cobb & Drew, Plymouth, Mass.
Henderson, Jas. S., 165 Greenwich, N. Y.

Rock Drills.

Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Rand Drill Co., 28 Park Place, N. Y.

Rolling Mill Machinery.
Birmingham Iron Fdry, Birmingham, Conn.
Booth, The Lloyd, Co., Youngstown, O.

Leschburg Foundry & Mch. Co., Pittsburgh, Pa.
Mahoning Fdry & Mch. Co., Danville, Pa.
Morgan Construction Co., Worcester, Mass.

Robinson-Rea Mfg. Co., Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.
Tretlowey Mfg. Co., Pittsburgh, Pa.
Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

Roll Lathes.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.
Rolls, Chilled, Sand and Steel.
Booth, The Lloyd, Co., Youngstown, O.

Garrison, A. Fdry, Co., Pittsburgh, Pa.
Johnson Foundry Co., Johnstown, Pa.
Seaman, Sleeth & Black, Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Roofing.
Berlin Iron Bridge Co., E. Berlin, Conn.
Boston Bridge Works, Boston, Mass.
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.

Johns, H. W. Mfg. Co., 87 Maiden Lane.
Rope and Web Goods.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.

Rope Wheels.
Cresson, Geo. V. Co., Philadelphia, Pa.
Rubber Goods.
Canfield, H. O., Bridgeport, Conn.

Rules, Manufacturers of.
Keuffel & Esser Co., 127 Fulton St., N. Y.
Lufkin Rule Co., Saginaw, Mich.
Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, N. Y.

Sand Paper.
Baeder, Adamson & Co., Phila., Pa.
Sash Balances.
Pulman Sash Balance Co., Rochester, N. Y.

Vanderbilt Sash Balance Co., Canandaigua, N. Y.
Sash Cords and Chains.
Morton, Thos., 65 Elizabeth, N. Y.

Ossawan Mills Co., Norwich, Conn.
Samson Cordage Works, Boston, Mass.
Smith & Egge, Mfr. Co., Bridgeport, Conn.
Cincinnati Corrugating Co., Piqua, O.

Sash Locks.
Ives, H. B. & Co., New Haven, Conn.
Sash Pulleys.
Empire Portable Forge Co., Lansingburgh, N. Y.

Palmer Hardware Mfg. Co., Troy, N. Y.
Sash Weights.
Brown, E. & Co., Philadelphia, Pa.
Saws, Makers of.
Disston, Henry & Sons, Phila., Pa.

Hiles, C. A. Co., 338-338 Carroll Ave, Chicago, Ill.
National Saw Co., 96 Reade St., N. Y.
Simonds Mfg. Co., Fitchburg, Mass.

Saw Sets.
Kohler, F. E. & Co., Canton, Ohio.
Taintor Mfg. Co., 84-86 Chambers, N. Y.
Scales, Manufacturers of.
Buffalo Scale Co., Buffalo, N. Y.

Chatillon, John & Sons, 85-89 Cliff, N. Y.
Scrapers, Road.
Am. Steel Scraper Co., Sidney, Ohio.

Kilbourne & Jacobs Mfg. Co., Columbus, O.
Sidney Steel Scraper Co., Sidney, O.
Screens, Coal and Ore.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Screens, Door and Window.
Queen Anne Screen Co., Burlington, Vt.
Screw Cutting Machinery.
Wells Bros. & Co., Greenfield, Mass.

Wiley & Russell Mfg. Co., Greenfield, Mass.
Screw Drivers.
Brown, R. H. & Co., New Haven, Conn.
Capitol Mfg. Co., Chicago, Ill.

Mayhew, H. H. Co., Shelburne Falls, Mass.
Screw Plate and Pipe Cutter.
Jarecki Mfg. Co., Erie, Pa.

Screws, Makers of.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Wm. H. Haskell Co., Pawtucket.

Miles, S. S., 205 Quarry, Philadelphia.
National Screw & Tack Co., Cleveland, Ohio.
Reynolds & Co., New Haven, Conn.
Worcester Machine Screw Co., Worcester, Mass.

Seroll Saws.
Barnes, W. F. & John, Rockford, Ill.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
Seythe Stones and Whetstones.
Pike Mfg. Co., Pike Station, N. H.

Cleveland Stone Co., Cleveland, O.
Shafting, Makers of.
Cresson, Geo. V. Co., Philadelphia, Pa.
Fairmount Mch. Co., Philadelphia, Pa.

Fittsimons & Co., Cleveland, Ohio.
Sellers, Wm. & Co., Inc., Phila., Pa.
Stow Mfg. Co., Binghamton, N. Y.
Shaped Iron and Steel.—Manufacturers of.
Ema-Standard Iron & Steel Co., Bridgeport, O.

See Alphabetical Index, Pages 99 & 100.

- Allentown Rolling Mill.** Allentown, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Passaic Rolling Mill Co., Paterson, N.J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
Tudor Iron Works, St. Louis, Mo.
- Shears and Scissors.**
Acme Shear Co., Bridgeport, Conn.
Reinischs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Atna Standard Iron and Steel Co., Bridgeport, Conn.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburg, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Moorehead-McCleane Co., Pittsburg, Pa.
Pierson & Co., 29 Broadway, N. Y.
Rely, John W., Fort Hunter, P. O., Pa.
Singer, Nimick & Co., Ltd., Pittsburg, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Metal Work.**
Clark & Cowles, Plainville, Conn.
- Sheet Zinc.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**
Koch, A. B. & Co., Peoria, Ill.
- Sinks.**
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**
Dame, Stoddard & Kendall, Boston, Mass.
Sickels, Sweet & Lyon, 35 Barclay St., N. Y.
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Henley, M. C., Richmond, Ind.
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Smelting Works.**
Reeves, Paul S., 780 S. Broad, Phila.
- Sparking Tubes.**
Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Konigsberg, O., Cleveland, O.
- Speed Indicators.**
Church & Slight, 109 Fulton St., N. Y.
- Spelter.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**
Boardman, L. & Son, New Haddam, Conn.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, The Wm. Mfg. Co., Hartford, Conn.
Rogers & Hamilton Co., Waterbury, Conn.
- Sporting Goods.**
Hartley & Graham, 313-315 B'way, N. Y.
- Springs.**
American Spiral Spring Co., Pittsburg, Pa.
Cary, Alanson, 240-242 W. 29th St., N. Y.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Nourse, Fred. Co., 315 to 319 E. 22d St., N. Y.
Roland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**
Bardley, J., 149 & 151 Baxter St., N. Y.
Chicago Spring Butt Co., Chicago, Ill.
Fulman Sash Balance Co., Rochester, N. Y.
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Spring Keys and Cotters.**
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
- Sprinklers.**
Smith, Oliver A., Clarkston, Mich.
- Stamped Ware.**
Am. Stamping Co., 104 & 106 John St., New York
- Stamping Works.**
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
Bristols Mfg. Co., Waterbury, Conn.
- Steam Hammer, &c., Makers of.**
Dienelt & Eisenhardt, Philadelphia.
Dudgdon, Richard, 24 Columbia Street, N. Y.
Trethewey Mfg. Co., Pittsburg, Pa.
- Steam Heating.**
Webster Warren & Co., Camden, N. J.
- Steam Separators.**
Goubert Mfg. Co., 32 Cortland St. N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
- Steel Balls.**
Grant Anti-Friction Ball Co., Fitchburg, Mass.
- Steel, Cold Rolled Strip.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**
Krogerud, W., 61 Fulton, N. Y.
- Steel Importers.**
Abbott, Wheelock & Co., N. Y. and Boston.
Hosson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Maline, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Whitcomb Bros., 93 Liberty St., N. Y.
Walters, A. R. & Co., B'way, N. Y.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Atna Standard Iron & Steel Co., Bridgeport, Conn.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St. Carbon Steel Co., Pittsburg, Pa.
Chatham Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburg, Pa.
Elken & Co., Hagen, Germany.
Frankford Steel Co., Philadelphia.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Hosson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Kayser, Ellison & Co., Sheffield, Eng.
La Belle Steel Co., Pittsburg, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburg, Pa.
Moss, F. W., 83 John, N. Y.
Naylor & Co., 45 Wall, N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Rely, J. W., Fort Hunter P. O., Pa.
Rowland, Wm. & Harvey, Frankford, Philadelphia.
Singer, Nimick & Co., Pittsburg, Pa.
Stanley Works, New Britain, Conn.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Taylor Iron & Steel Co., High Bridge, N. J.
Wardlaw S. & C., Sheffield, Eng.
Wetherell Bros., 93 Liberty, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**
Barnes, C. E. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 B'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierson & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Montour Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburg, Pa.
- Step Ladders.**
Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.
- Stocks and Dies.**
Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stove Linings.**
Bicycle Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**
Cheney, S. & Son Manlius, N. Y.
- Stove Trimmings.**
Troy Nickel Works, Troy, N. Y.
- Street Lamps.**
Dietz, R. E. Co., 60 Light St., N. Y.
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Strops.**
Electric Cutlery Co., 113 Chambers, N. Y.
J. B. Torrey & Co., Worcester, Mass.
- Stropping Machines.**
Schmitz, E. Lothar, 92 Reade St., N. Y.
- Structural Iron Work.**
Berlin Iron Bridge Co., East Berlin, Conn.
Boston Bridge Wks., Boston, Mass.
Lindsay, Jas. G. & Co., Phila., Pa.
Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**
Atlas Tack Corporation, Boston, Mass.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Nat. Screw & Tack Co., Cleveland, O.
Phillips, E. & Sons, South Hanover, Mass.
Plymouth Mills, Plymouth, Mass.
Trautman, W. E., Whitman, Mass.
- Taps and Dies.**
Futterfield & Co., Derby Line, Vt.
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
Riehle Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
Riehle Bros. Testing Mch. Co., Phila.
- Theatrical Hardware.**
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
Fratt Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.
- Time Record.**
Scattergood, H. W., Phila., Pa.
- Tinners' Hardware.**
Berger Bros., Philadelphia, Pa.
- Tin Plate Machinery.**
Lloyd Booth Co., Youngtown, Ohio.
- Tinware.**
Am. Stamping Co., 104 & 106 John St., New York
- Tire Upsetters.**
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**
Burke, P. F., Boston, Mass.
- Tool Chests.**
Am. Tool Co., 200 W. Houston St., N. Y.
- Tools.**
Britton, Horace E., Stoughton, Mass.
Brown, R. H. & Co., New Haven, Conn.
Frasson Co., 19 Warren St., New York.
Marlow, H. E. Co., Shelburne Falls, Mass.
Millers Falls Co., 93 Reade, N. Y.
Richardson, C. F. & Son, Athol, Mass.
Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, New York.
Starrett, L. S., Athol, Mass.
- Tools, Blacksmith and Wheelwrights.**
Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway, Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.**
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasolene.**
Dangler Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, O.
Standard Lighting Co., Cleveland, O.
- Transom Lifters.**
Wollensak, J. F., Chicago, Ill.
- Trucks, Manufacturers of.**
Berger Bros., Philadelphia, Pa.
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Clark, G. P., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.
- Tubes, Seamless Drawn Copper.**
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
Leng's John S. Son & Co., 4 Fletcher St., New York.
Mannesmann Tube Co. Ltd., Landore, England.
- Tumbling Barrels.**
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
Cleveland Twist Drill Co., Cleveland, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**
Best, Fox & Co., Pittsburg, Pa.
Chapman Valve Mfg. Co., Boston.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., 71 John, N. Y.
McNab & Harlin Mfg. Co., 56 John, N. Y.
Mason Regulator Co., Boston, Mass.
- Ventilator Appliances.**
Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
Newark Mch. Tool Co., Newark, N. J.
- Vises.**
Capital Mch. Tool Co., Auburn, N. Y.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay N. Y.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Wagon Jacks.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
Haskell, Wm. H. Co., Prtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.
- Water Meters.**
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
Poole, Robt. & Son Co., Baltimore, Md.
- Wheelbarrows.**
Akron Tool Co., Akron, O.
Amer. Steel Scrap Co., Sidney, Ohio.
Cockburn Barrow & Mch. Co., Jersey City, N. J.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
- Lansing Wheelbarrow Co.,** Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.
Sweet Mfg. Co., Minneapolis, Minn.
- Whips.**
American Whip Co., Westfield, Mass.
- Wire Cord, Makers of.**
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
Amer. Spiral Spring Co., Pittsburg, Pa.
Consolidated Steel & Wire Co., St. Louis, Mo.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Salem Wire Nail Co., Salem, N. J.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wetzel Bros., 93 Liberty St., N. Y.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Ester, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff, N. Y.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Reliance Wire & Iron Wks., Milwaukee, Wis.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleveland.
- Wire Cutters.**
Higginum Hdw. Co., Higginum, Conn.
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.
- Wire Door Mats.**
Hartman Mfg. Co., Elwood City, Pa.
Horrocks, Joshua, 45 Cliff St., N. Y.
The Wire Goods Co., Worcester, Mass.
- Wire Fences.—See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Ossawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
Wire Goods Co., Worcester, Mass.
Wickwire Bros., Cortland, N. Y.
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Conn.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Outlining Machinery.**
Adt, John & Son, New Haven, Conn.
- Wire Nails.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, E. & Sons, South Hanover, Mass.
Phillips, Townsend & Co., Phila., Pa.
Plymouth Mills, Plymouth, Mass.
Salem Wire Nail Co., Salem, O.
Whitney, A. K. & Co., New York City
- Wire Rods, Steel.**
Consolidated Steel & Wire Co., St. Louis, Mo.
New Castle Wire Nail Co., New Castle, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Wire Rope, Iron and Steel.**
Makers.
Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Cazard Mfg. Co., Wilkesbarre, Pa.
A. Leechen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.
- Wood-Working Machinery.**
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrenches, Manufacturers of.**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Capitol Mfg. Co., Chicago, Ill.
Central Iron & Steel Co., Brazil, Ind.
Coss Wrench Co., Worcester, Mass.
Keystone Mfg. Co., Buffalo, N. Y.
Portsmouth Wrench Co., Boston, Mass.
Trinmont Mfg. Co., Roxbury, Mass.
Williams, J. H., Brooklyn, N. Y.
- Wringers.**
Colby Wringer Co., Montpelier, Vt.

ALPHABETICAL INDEX TO ADVERTISERS.

| | | | | | | | |
|---|-----|--------------------------------------|-----|-----------------------------------|---------|--------------------------------------|---------|
| Abbott, Wheelock & Co..... | 19 | Buffalo Forge Co..... | 102 | Dangler Stove & Mfg. Co..... | 80 | Harrington, E. Son & Co..... | 51 |
| Acme Shear Co..... | 71 | Buffalo Scale Co..... | 88 | Darby, Edw. & Sons..... | 8 | Harrington & King Perforating Co.. | 11 |
| Adt, John & Son..... | 40 | Buffalo Edge Tool Works..... | 70 | Davis & Cook..... | 62 | Harrisburg Fdy. & Mch. Wks..... | 31 |
| Atme-Standard Iron & Steel Co..... | 21 | Buffalo Specialty Mfg. Co..... | 69 | Davis, I. B. & Son..... | 25 | Harrison Safety Boiler Wks..... | 31 |
| Alken, Henry..... | 26 | Bullock Bellows Co..... | 42 | Davol, John & Sons..... | 2 | Hart, Henry C. Mfg. Co..... | 77 |
| Akron Tool Co..... | 90 | Burden Iron Co..... | 86 | Dayton Malleable Iron Co..... | 102 | Hart Mfg. Co..... | 46 |
| Alexander Bros..... | 38 | Burditt & Williams..... | 78 | Dean Bros. Steam Pump Works..... | 37 | Hartford Steam Boiler Insp. and Ins. | |
| Allentown Rolling Mills..... | 31 | Burgess & Loxley..... | 102 | Deltz, A. E..... | 83 | Co..... | 33 |
| Almond, T. R..... | 41 | Burke, P. F..... | 87 | DeKalb Fence Co..... | 9 | Hartley & Graham..... | 1 |
| Am, Bolt Co..... | 93 | Burnham, Geo. & Co..... | 37 | Deming Co..... | 64 | Hartman Mfg. Co..... | 9 |
| Am. Metal Co..... | 4 | Burr & Houston Co..... | 27 | Detrick & Harvey Machine Co..... | 51 | Haskell, Wm. H. Co..... | 94 |
| Am. Pig Iron & Storage Warrant Co.. | 21 | Bussenius & Cunliffe..... | 56 | Detroit Foundry Equipment Co..... | 28 | Hazard Mfg. Co..... | 6 |
| Am. Screw Co..... | 14 | Butcher, W. & S..... | 72 | Diamond State Iron Co..... | 86 | Heinrich's R. Sons Co..... | 71 |
| Am. Spiral Spring Co..... | 4 | Butterfield & Co..... | 46 | Dienelt & Eisenhardt..... | 43 | Henderer, A. L..... | 43 |
| Am. Stamping Co..... | 63 | Butts & Ordway..... | 44 | Dietz, R. E. Co..... | 79 | Henderson Bros..... | 36 |
| Am. Steel Scraper Co..... | 90 | Byram & Co..... | 29 | Diston, Henry & Sons..... | 67 | Hendey Machine Co..... | 60 |
| Am. Tool Co..... | 75 | C. & C. Electric Motor Co..... | 31 | Dixon, Jos., Crucible Co..... | 39 | Hendricks Bros..... | 2 |
| Am. Whip Co..... | 101 | Californi Wire Works..... | 5 | Donaldson Iron Co..... | 21 | Hendrick Mfg. Co., Ltd..... | 13 |
| Ames Sword Co..... | 82 | Cambria Iron Co..... | 20 | Doscher, Martin..... | 71 | Hendryx, A. B. Co..... | 3 |
| Ansonia Brass & Copper Co..... | 2 | Cambridge Iron & Steel Co..... | 25 | Douglas, W. & B..... | 64 | Henley, M. C..... | 78 & 92 |
| Arcade Malleable Iron Co..... | 25 | Cambridge Roofing Co..... | 16 | Draper Machine Tool Co..... | 54 | Henn, A. S. & Co..... | 70 |
| Armstrong Mfg. Co..... | 42 | Canfield, H. O..... | 39 | Dudgeon, Richard..... | 44 | Herbrand Co..... | 24 |
| Artificial Gas Engineering Co..... | 29 | Canton Saw Co..... | 63 | Dur Jar Bros..... | 5 | Herrick, J. A..... | 23 |
| Ashcroft Mfg. Co..... | 35 | Capital Machine Tool Co..... | 64 | Dunham Nut Machir. Co..... | 53 | Higganum Hdw. Co..... | 64 |
| Atlas Tack Corporation..... | 12 | Capitol Mfg. Co..... | 89 | Durant, W. N..... | 34 | Hietz, T. & Son..... | 4 |
| Babeock & Wilcox Co..... | 36 | Carbon Steel Co..... | 21 | Dwight Slate Machine Co..... | 42 | Hiles, C. A. & Co..... | 66 |
| Paeder, Adamson & Co..... | 62 | Carlin's Sons, Thomas..... | 55 | Eagle Anvil Works..... | 69 | Hillebrand & Wolf..... | 45 |
| Banker & White..... | 63 | Carpenter, J. M. Tap & Die Co..... | 101 | Eagle Bicycle Mfg. Co..... | 101 | Hill, Clarke & Co..... | 55 |
| Bardsley, J..... | 83 | Cary, Alanson..... | 5 | Eccles, Richard..... | 84 | Hobson, F., Seaman & Co..... | 19 |
| Barns, C. K. & Co..... | 22 | Chadborne & Coldwell Mfg. Co..... | 90 | Eddy Electric Mfg. Co..... | 31 | Hoffman, C. & A..... | 70 |
| Barnes, W. F. & John..... | 41 | Chambers Bros. Co..... | 94 | Edge Moor Iron Co..... | 30 | Hoffman, J. W. & Co..... | 18 |
| Barnett, G. & H..... | 69 | Champion Blower & Forge Co..... | 47 | Elken & Co..... | 20 | Hogan, John L. & Co..... | 18 |
| Barnum, E. T..... | 9 | Champion Iron Co..... | 9 | Electric Cutlery Co..... | 72 | Hollands Mfg. Co..... | 60 |
| Bass Foundry & Machine Works..... | 34 | Chapman Mfg. Co..... | 102 | Emory, P. P. Mfg. Co..... | 9 | Holmes, Booth & Haydens..... | 2 |
| Belden Machine Co..... | 41 | Chapman Valve Mfg. Co..... | 31 | Empire Portable Forge Co..... | 83 | Holmes & Edwards Silver Co..... | 73 |
| Bell, Geo. E..... | 47 | Chatillon, John & Sons..... | 79 | Enterprise Mfg. Co. of Pa..... | 86 | Holt, Hiram & Co..... | 91 |
| Bellevue Pump Co..... | 64 | Cheney, S. & Son..... | 25 | Erie Engine Works..... | 35 | Horrocks, Joshua..... | 12 |
| Bement, Miles & Co..... | 43 | Chess Bros..... | 25 | Estey, W. S..... | 25 | Hotchkiss, E. S..... | 75 |
| Bemis & Call Hardware & Tool Co.... | 38 | Chester Steel Casting Co..... | 26 | Ette & Henger Mfg. Co..... | 91 | Houston, C. B. & Co..... | 18 |
| Berger Bros..... | 88 | Chicago Spring Butt Co..... | 84 | Etting, Edw. J..... | 18 & 26 | Howard Iron Works..... | 88 |
| Berlin Iron Bridge Co..... | 10 | Chrome Steel Works..... | 24 | Eureka Cast Steel Co..... | 102 | Howard & Morse..... | 7 |
| Best, Fox & Co..... | 38 | Church, Isaac..... | 94 | Evans-Friction Cone Co..... | 3 | Howson & Howson..... | 6 |
| Bethlehem Iron Co..... | 22 | Church & Sleight..... | 84 | Eynon-Evans Mfg. Co..... | 33 | Hulbert Bros. & Co..... | 101 |
| Bevin Bros. Mfg. Co..... | 76 | Cincinnati Corrugat'g Co..... | 9 | F. & N. Mfg. Co..... | 92 | Hunt, Robert W. & Co..... | 53 |
| Bickford Drill & Tool Co..... | 50 | Cincinnati Milling Mch. Co..... | 52 | Fairmount Machine Co..... | 51 | Hurley Bros..... | 41 |
| Bicycle Step Ladder Co..... | 81 | Claffen Mfg. Co..... | 39 | Fearing, Wm. S..... | 2 | Ideal Mfg. Co..... | 77 |
| Bigelow, C. R..... | 55 | Clapp, Geo. M..... | 55 | Ferdinand, L. W. & Co..... | 77 | Illinois Pure Aluminum Co..... | 76 |
| Bigall & Keeler Mfg. Co..... | 44 | Clark, H. P..... | 91 | Field, Alfred & Co..... | 70 | Indiana Wire Fence Co..... | 3 |
| Billings & Spencer Co..... | 38 | Clark & Cowles..... | 6 | Fitch, W. & E. T..... | 101 | Ingersoll Milling Machine Co..... | 43 |
| Billington, J. H. & Co..... | 33 | Cleveland Block Co..... | 84 | Fitchburg Machine Works..... | 43 | Ives, H. B. & Co..... | 88 |
| Bingham, W. Co..... | 77 | Cleveland City Forge & Iron Co..... | 1 | Fitzsimons & Co..... | 18 | Jacobus, W. H..... | 94 |
| Birmingham Iron Foundry..... | 25 | Cleveland Rubber Works..... | 73 | Flags, Stanley G. & Co..... | 102 | Jarecki Mfg. Co..... | 42 |
| Bissell, E. Son & Co..... | 56 | Cleveland Stamping & Tool Co..... | 79 | Foos Mfg. Co..... | 93 | Jeffrey Mfg. Co..... | 38 |
| Blake & Johnson..... | 13 | Cleveland Stone Co..... | 52 | Forehand Arms Co..... | 78 | Jenkins Bros..... | 1 |
| Bliss Co., E. W..... | 40 | Cleveland Twist Drill Co..... | 48 | Fram, E. T..... | 82 | Jenkins & Lingle..... | 41 |
| Boardman, L. & Son..... | 70 | Clinton Wire Cloth Co..... | 8 | Frankford Steel Co..... | 20 | Jenner, H. W. T..... | 6 |
| Bogert, John L..... | 52 | Cobb & Drew..... | 13 | Fraser Co..... | 45 | Jessop, Wm. & Sons..... | 19 |
| Boker, Hermann & Co..... | 19 | Cockburn Barrow & Machine Co..... | 90 | Frost Thill Spring Co..... | 84 | Johns, H. W. Mfg. Co..... | 16 |
| Boone, W. C. Mfg. Co..... | 27 | Coes, Loring & Co..... | 89 | Fulton Iron & Engine Works..... | 50 | Johnson Foundry Co..... | 27 |
| Booth, The Lloyd Co..... | 30 | Coes Wrench Co..... | 89 | Gardner, Jas. & Son..... | 26 | Johnson, I. G. & Co..... | 102 |
| Borden & Lovell..... | 13 | Coffin & Leighton..... | 42 | Garrison, A., Foundry Co..... | 25 | Johnson, I. H., Jr., & Co..... | 50 |
| Borgner, Cyrus..... | 30 | Colburn, A. M..... | 46 | Gartland Foundry Co..... | 30 | Johnson, S. C..... | 65 & 93 |
| Boston Bridge Works..... | 16 | Colby Wringer Co..... | 81 | Garry Iron & Steel Rfg. Co..... | 7 | Jones, B. M. & Co..... | 22 |
| Boston Gear Works..... | 36 | Coldwell Lawn Mower Co..... | 92 | Garvin Machine Co..... | 55 | Jones, Jesse & Co..... | 83 |
| Box, Alfred & Co..... | 50 | Colliau, Victor..... | 29 | Gautier Steel Department..... | 16 | Jones & Lamson Machine Co..... | 60 |
| Boyce Rivet Co..... | 102 | Conroy, P. J. & Co..... | 84 | Gaylord, F. L. Co..... | 3 | Kayser, Ellison & Co..... | 19 |
| Bradlee & Co..... | 17 | Consolidated Steel & Wire Co..... | 15 | Gilbert & Bennett Mfg. Co..... | 8 | Keeley, Jerome & Co..... | 18 |
| Bradley Fertilizer Co..... | 38 | Continental Iron Works..... | 34 | Glazier Stove Co..... | 61 | Kennedy, Julian..... | 28 |
| Brass Goods Mfg. Co..... | 2 | Corning, Edw. & Co..... | 17 | Goodell Co..... | 72 | Keuffel & Esser Co..... | 65 |
| Bridgeport Chain Co..... | 73 | Correspondence School of Mechanics | 101 | Goubert Mfg. Co..... | 38 | Keyless Lock Co..... | 82 |
| Bridgeport De-oxidized Bronze & Metal Co..... | 2 | Cotton, Barolay W. & Co..... | 17 | Gould & Eberhardt..... | 39 | Keys, W. W. & R. M. Co..... | 3 |
| Bridgeport Gun Implement Co..... | 48 | Coulter & McKenzie Machine Co..... | 49 | Graham, John H. & Co..... | 75 | Keystone Clutch & Machine Works.. | 46 |
| Briggs, Marvin..... | 55 | Covert Mfg. Co..... | 84 | Grand Crossing Tack Co..... | 12 | Keystone Mfg. Co..... | 63 |
| Bristols' Mfg. Co..... | 1 | Covert's Saddlery Works..... | 61 | Grant Anti-Friction Ball Co..... | 42 | Kilbourne & Jacobs Mfg. Co..... | 90 |
| Britton, J. Blodgett..... | 29 | Cox, Justice, Jr..... | 22 | Grant Corundum Wheel Mfg. Co..... | 53 | Kilmer Mfg. Co..... | 9 |
| Britton, Horace F..... | 93 | Cramp, Wm. & Sons S. & E. B. Co..... | 3 | Green, A. H..... | 38 | King, J. M. & Co..... | 69 |
| Brodierick & Bascom Rope Co..... | 6 | Crescent Horse Shoe & Iron Co..... | 86 | Gurney, F. B..... | 71 | Knapp & Cowles Mfg. Co..... | 73 |
| Bronson Supply Co..... | 79 | Crescent Phosphorized Metal Co..... | 3 | Halgat & Climmermann..... | 27 | Koch, A. B. & Co..... | 65 |
| Brown, E. E. & Co..... | 83 | Crescent Steel Co..... | 21 | Haines & Zimmermann..... | 78 | Kohler, F. E. & Co..... | 92 |
| Brown Holsting & Conveying Mch. Co. | 38 | Cresson, Geo. V. Co..... | 45 | Halk & Naumann..... | 30 | Konigsloew, Otto..... | 98 |
| Brown, R. H. & Co..... | 62 | Croissant, M..... | 81 | Hall & Ross Husking Glove Co..... | 90 | Kreischer, B. & Sons..... | 26 |
| Bryden Horse Shoe Co..... | 86 | Crosby, G. A. & Co..... | 41 | Halsey, Jas. T..... | 46 | Krogsrud, W..... | 68 |
| Buck Bros..... | 71 | Crosby Steam Gage & Valve Co..... | 3 | Hamilton Machine Tool Co..... | 44 | La Belle Steel Co..... | 23 |
| Buckeye Engine Co..... | 34 | Cross & Speirs Machine Co..... | 44 | Hammer & Co..... | 88 | Lafin & Rand Powder Co..... | 23 |
| | | Crown Smelting Co..... | 3 | Hardware Board of Trade..... | 56 | Lane Brothers..... | 82 |
| | | Cruikshank, D. B..... | 54 | | | Lansing Wheelbarrow Co..... | 90 |
| | | Cumberland Nail & Iron Co..... | 18 | | | Lape, W. E..... | 91 |
| | | Curlay, J. & Bro..... | 71 | | | Laughlin, Alex & Co..... | 28 |
| | | Cushman Chuck Co..... | 46 | | | | |
| | | Dallett, Thos. H. & Co..... | 48 | | | | |
| | | Dame, Stoddard & Kendall..... | 76 | | | | |

| | | | | | | | |
|----------------------------------|----------|------------------------------------|-----|-----------------------------------|-----|--|-------------|
| Lea, J. Tatnall & Co. | 23 | N. J. Wire Cloth Co. | 8 | Riehl Bros. Testing Machine Co. | 40 | Syracuse Specialty Mfg. Co. | 91 |
| Lean, D. R. Co. | 29 | New Process Twist Drill Co. | 48 | Ripley Mfg. Co. | 82 | Taintor Mfg. Co. | 89 |
| Leavitt Machine Co. | 78 | New Process Raw Hide Co. | 49 | Riverside Iron Works. | 24 | Tablet & Ticket Co. | 49 |
| Le Count, C. W. | 86 | Newton & Shipman. | 19 | Roberts, A. & P. & Co. | 20 | Talcott, W. O. | 39 |
| Leechburg Foundry & Machine Co. | 21 | N. Y. Belting & Packing Co. | 39 | Roberts, Frank C. & Co. | 28 | Taylor Iron & Steel Co. | 24 |
| Le Massena, C. E. & Co. | 52 | N. Y. Machinery Depot. | 54 | Roberts Mfg. Co. | 38 | Thomson, W. H. & Co. | 18 |
| Leng's, Jno. S. Son & Co. | 102 | N. Y. Mallet & Handle Works. | 34 | Robinson-Rea Mfg. Co. | 26 | Tiebout, W. & J. | 38 |
| Leonard, B. E. | 89 | N. Y. Powder Co. | 25 | Rogers & Hamilton Co. | 65 | Titchener, E. H. & Co. | 4 |
| Leonard, J. | 22 | Nicholson File Co. | 68 | Rogers, The Wm. Mfg. Co. | 73 | Tod, Wm. & Co. | 34 |
| Leonard T. F. | 89 | Nicolls, Wheeler & Co. | 17 | Rollason Gas Engines. | 35 | Toledo Bicycle Co. | 77 |
| Leschen, A. & Sons Rope Co. | 6 | Niles Tool Works. | 55 | Rouse, Hazard & Co. | 61 | Toledo Block Works. | 84 |
| Levis, Henry & Co. | 22 | North Bros. Mfg. Co. | 13 | Rowland, Wm. & Harvey. | 102 | Toomey, Frank. | 55 |
| Lidgerwood Mfg. Co. | 102 | North Bros. Mfg. Co. | 61 | Russell, Burdall & Ward. | 102 | Torrey, J. R. Razor Co. | 71 |
| Lindsay, Jas. G. & Co. | 18 | Northampton Cutlery Co. | 72 | Russia Cement Co. | 63 | Totten & Hogg Iron and Steel Fdry. | 25 |
| Link-Belt Engineering Co. | 41 | Northampton Emery Wheel Co. | 52 | St. Louis Bronze & Aluminum Works | 2 | Co. | 94 |
| Lockhart Iron & Steel Co. | 23 | Norton Emery Wheel Co. | 52 | Sabin Machine Co. | 4 | Townsend, W. P. & Co. | 94 |
| Lodge & Shipley Machine Tool Co. | 53 | Norton & Jones Machine Tool Works. | 39 | Salem Foundry & Machine Shop. | 50 | Trenton Iron Co. | 4 |
| Lovell, Jno. P. Arms Co. | 77 | Norwalk Iron Works Co. | 37 | Salem Wire Nail Co. | 13 | Trenton Malleable Iron Co. | 27 |
| Lovell Mfg. Co., Ltd. | 57 | Nourse, Fred Co. | 5 | Samson Cordage Works. | 1 | Threthewey Mfg. Co. | 28 |
| Lovell, Tracy & Co. | 87 | Nubian Iron Enamel Co. | 49 | Samuel, Frank. | 17 | Trimont Mfg. Co. | 88 |
| Lovegrove & Co. | 55 | Obermayer, S. Co. | 21 | Sargent Co. | 30 | Troy Nickel Works. | 71 |
| Loyd, John. | 64 | Ogden & Wallace. | 22 | Saunders's Sons, D. | 44 | Tudor Iron Works. | 1 |
| Ludlow-Saylor Wire Co. | 7 | Ohio Lantern Co. | 78 | Scattergood, H. W. | 53 | Tyler Wire Works Co. W. S. | 60 |
| Lufkin Rule Co. | 65 | Old Dominion Iron & Nail Works Co. | 87 | Schaeffer & Co. | 91 | Underhill, Clinch & Co. | 70 |
| Lukens Iron & Steel Co. | 17 | Osborn, G. Edw. & Co. | 34 | Scheeler & Sons. | 6 | Union Mfg. Co. | 47 |
| Lundberg, Gustaf. | 19 | Ossawan Mills Co. | 61 | Schmitz, E. Lothar. | 70 | Union Metallic Cartridge Co. | 1 |
| McCabe, J. J. | 54 | Ostrander Fire Brick Co. | 26 | Schneekloth, H. A. | 42 | Valentine, M. D. & Bro. | 30 |
| McCaffrey File Co. | 68 | Ostrander, W. R. & Co. | 62 | Schneider & Trenkamp Co. | 89 | Valley Pump Works. | 37 |
| McClure, Amsler & Co. | 28 | Otto Gas Engine Works. | 35 | Schwarzenberg Bros. & Co. | 53 | Van Dorn Iron Works Co. | 7 |
| McCoy, Jos. F. & Co. | 66 | Oxford Iron & Nail Co. | 13 | Scott, Geo. M. | 38 | Vanderbilt Sash Balance Co. | 82 |
| McFarland, Wm. | 4 | Packer, C. W. | 61 | Seville Mfg. Co. | 2 | Van Wagoner & Williams Co. | 102 |
| McGowan, J. H. & Co. | 37 | Palmer & De Mooy. | 26 | Scranton Forging Co. | 86 | Victor Mfg. Co. | 83 |
| McIlvain, Wm. & Sons. | 27 | Palmer Hardware Mfg. Co. | 62 | Scranton Supply & Machine Co. | 54 | Vulcan Iron Works. | 25 |
| McKay, Jas. & Co. | 18 | Pancoast Henry, B. & Co. | 45 | Seaman, Sleeth & Black. | 25 | Wallace Wm. H. & Co. | 22 |
| McKinney Mfg. Co. | 81 | Passaic Rolling Mill Co. | 22 | Sellers, Wm. & Co. | 51 | Wardlaw, S. & C. | 19 |
| McKinnon Dash & Hdw. Co. | 87 | Paxson, J. W. & Co. | 21 | Seneca Falls Mfg. Co. | 50 | Washburn & Moen Mfg. Co. | 4 |
| McLean, John. | 34 | Peabody & Parks. | 66 | Sessions Foundry Co. | 26 | Washburn Shops. | 47 |
| McLeod & Henry Co. | 26 | Peck, A. G. & Co. | 102 | Seyfert's Sons, L. F. | 54 | Waterbury Brass Co. | 2 |
| McNab & Harlin Mfg. Co. | 34 | Peerless Foundry Co. | 26 | Shipman Engine Co. | 35 | Waterbury Farrel Foundry & Machine Co. | 37 |
| Machinists' Supply Co. | 55 | Penna. Diamond Drill & Mfg. Co. | 36 | Shoenberger & Co. | 85 | Waterbury Machine Co. | 45 |
| Mahoning Foundry & Machine Shop | 24 & 51 | Pennsylvania Mch. Co. | 54 | Shultz Belding Co. | 1 | Watson & Stillman. | 44 |
| Mahoning Valley Iron Co. | 22 | Perry, W. H. & Co. | 54 | Sibell, Geo. H. & Co. | 55 | Webster, Warren & Co. | 32 |
| Main Belting Co. | 39 | Philadelphia Drop Forge Co. | 27 | Sickels, Sweet & Lyon. | 76 | Weiland, Chas. | 57 |
| Mannesmann Tube Co. | 24 | Philadelphia Engineering Wks. | 29 | Sidney Steel Scraper Co. | 91 | Wellman Iron & Steel Co. | 17 |
| Mann, Edwin R. & Co. | 18 | Phillips, E. & Sons. | 13 | Sigourney Tool Co. | 42 | Wells Bros. & Co. | 47 |
| Manning, Maxwell & Moore. | 48 | Phillips, Townsend & Co. | 9 | Sills, W. H. | 80 | West Cocksack Iron Fdy. | 27 |
| Manville Machine Co., E. J. | 53 | Phoenix Horseshoe Co. | 87 | "Silver Finish" | 5 | Western Wheel Works. | 77 |
| Mansfield, H. H. | 55 | Phoenix Iron Co. | 17 | Silver Mfg. Co. | 45 | Wetherell Bros. & Co. | 19 & 23 |
| Maris & Beekley. | 51 | Phoenix Iron Works Co. | 35 | Simonds Mfg. Co. | 66 | Wetherhill, Robt. & Co. | 101 |
| Maslin, J. & Son. | 37 | Phosphor Bronze Smelting Co. | 3 | Singer, Nimick & Co. | 23 | White, A. A. & Co. | 83 |
| Mason Regulator Co. | 101 | Pickands, Brown & Co. | 21 | Skinner Chuck Co. | 46 | White, L. & I. J. Co. | 71 |
| Mast, Foos & Co. | 9 | Pierson & Co. | 21 | Smith & Egge Mfg. Co. | 46 | White Mt. Freezer Co. | 61 |
| Matthiessen & Hegeler Zinc Co. | 2 | Pike Mfg. Co. | 52 | Smith, H. D. & Co. | 87 | Whitlock Coil Pipe Co. | 33 |
| Maurer, H. & Son. | 26 | Pilling & Crane. | 18 | Smith, J. D. Foundry Supply Co. | 26 | Whitman & Barnes Mfg. Co. | 68 |
| Mayhew, H. H. Co. | 70 | Pittsburgh I. & S. Eng. Co. | 29 | Smith Friction Drill and Tool Co. | 46 | Whitney, A. R. & Co. | 24 |
| Merrill Bros. | 18 | Pittsburgh Mfg. Co. | 43 | Smith, Oliver A. | 90 | Whitney, A. & Sons. | 22 |
| Merrill Mfg. Co. | 44 | Pittsburgh Reduction Co. | 60 | Smythe, S. R. Co., Inc. | 28 | Whiton, D. E. Mch. Co. | 46 |
| Merriman, A. H. | 44 | Place, Geo. | 54 | Sommer's Son, John. | 102 | Wickwire Bros. | 7 |
| Miles, F. S. | 13 | Plumb, Fayette R. | 72 | Southwark Foundry & Machine Co. | 35 | Wilcox & Howe Co. | 84 |
| Miller & Van Winkle. | 4 | Plume & Atwood Mfg. Co. | 2 | Speidel, J. G. | 51 | Wiley & Russell Mfg. Co. | 45 & 102 |
| Miller Lock Co. | 82 | Plymouth Mills. | 15 | Speirs, J. C. & Co. | 25 | Williams, J. H. & Co. | 88 |
| Millers Falls Co. | 62 & 102 | Pollock, W. B. & Co. | 34 | Spencer's I. S. Sons. | 27 | Williamson, C. T. Wire Nov. Co. | 101 |
| Milne, A. & Co. | 20 | Poole, Robt. & Son Co. | 36 | Springfield Brass Co. | 37 | Williamsport Wire Rope Co. | 6 |
| Milton Mfg. Co. | 93 | Pope Mfg. Co. | 61 | Standard Fdry. & Mfg. Co. | 27 | Willmot & Hobbs Mfg. Co. | 1, 59 & 102 |
| Miner & Peck Mfg. Co. | 42 | Popping, J. | 53 | Standard Horse Shoe Co. | 86 | Wilson, E. H. & Co. | 18 |
| Mohr, J. J. | 18 | Port Chester Bolt & Nut Co. | 93 | Standard Lighting Co. | 80 | Wilson, John. | 70 |
| Monce, S. G. | 84 | Portsmouth Wrench Co. | 88 | Standard Steel Casting Co. | 102 | Wilson, J. Fred. | 94 |
| Montour Iron & Steel Co. | 22 | Pottstown Iron Co. | 20 | Standard Tool Co. | 48 | Wilson, W. A. | 43 |
| Moore, Dr. Gideon E. | 60 | Pottsville Iron & Steel Co. | 17 | Stanley Rule & Level Co. | 101 | Winslow, Sm'l, Skate Mfg. Co. | 76 |
| Moore Mfg. & Foundry Co. | 50 | Powell Planer Co. | 43 | Stanley Works. | 61 | Wire Goods Co. | 6 |
| Moore & White Co. | 51 | Pratt & Whitney Co. | 47 | Stark Mch. & Tool Co. | 41 | Wister, Francis. | 27 |
| Moore & Wickert. | 92 | Prentiss Tool & Supply Co. | 54 | Starrett, L. S. | 65 | Wister, L. R. & Co. | 22 |
| Moorhead-McCleane Co. | 23 | Prentiss Vise Co. | 64 | Steam Gauge & Lantern Co. | 79 | Witherow, Jas. P. Co. | 28 |
| Morgan Construction Co. | 4 | Pullman, J. Wesley. | 23 | Stearns, E. C. & Co. | 60 | Wolcott & West. | 57 |
| Morgan Spring Co. | 4 | Pullman Sash Balance Co. | 83 | Steel & Iron Improvement Co. | 60 | Wolff, R. H. & Co. Ltd. | 5 |
| Morrison, Robert. | 35 | Queen Anne Screen Co. | 65 | Steptoe, J. & Co. | 56 | Wollensak, J. F. | 68, 73 & 83 |
| Morse Twist Drill & Machine Co. | 48 | Quint, A. P. | 44 | Sternbergh, J. H. & Son. | 94 | Wood Alan & Co. | 18 |
| Morse, Williams & Co. | 51 | Rainey, W. J. | 1 | Stevens Arms & Tool Co. | 75 | Wood, R. D. & Co. | 27 |
| Morton, Thos. | 81 | Rand Drill Co. | 36 | Stiles & Parker Press Co. | 40 | Wood, W. Dewees Co. | 23 |
| Moseley Iron Bridge & Roof Co. | 12 | Randolph & Clowes. | 1 | Stocking, E. B. | 6 | Worcester Mch. Screw Co. | 94 |
| Mount Carmel Bolt Co. | 101 | Read, Wm. & Sons. | 101 | Storm Mfg. Co. | 64 | Worthington, Henry R. | 37 |
| Myers, F. E. & Bro. | 64 | Reading Hardware Co. | 83 | Stover Mfg. Co. | 84 | Wright & Colton Wire Cloth Co. | 8 |
| National Horse Nail Co. | 87 | Reece, Edw. F. | 46 | Stow Flexible Shaft Co. | 48 | Wright, Peter & Son. | 66 |
| National Pipe Bending Co. | 33 | Reeves, Paul S. | 102 | Stow Mfg. Co. | 48 | Wrought Iron Bridge Co. | 15 |
| National Saw Co. | 66 | Relly, J. W. | 18 | Stuart & Peterson Co. | 77 | Wurster, F. W. & Co. | 102 |
| National Screw & Tack Co. | 12 | Reliance Wire Wks Co. | 8 | Sturtevant, B. F. Co. | 43 | Wyman & Gordon. | 27 |
| Naylor & Co. | 22 | Reynolds & Co. | 13 | Supplee Hardware Co. | 92 | Yale & Towne Mfg. Co. | 50 & 63 |
| Newark Machine Tool Works. | 60 | R.I. Perkins Horse Shoe Co. | 86 | Sweet Mfg. Co. | 90 | Zucker & Levett Chem. Co. | 31 |
| New Castle Wire Nail Co. | 13 | Rice, C. F. | 56 | Sweetser, W. A. | 29 | | |
| New Haven Copper Co. | 2 | Richards, D. W. & Co. | 56 | Swindell, W. & Bros. | 23 | | |
| New Haven Mfg. Co. | 46 | Richardson, C. F. & Son. | 65 | | | | |
| New Haven Wire Mfg. Co. | 6 | Ridgway, Craig & Son. | 49 | | | | |

Hopkins & Allen Mfg. Co.'s SINGLE BARREL SHOT GUN

12, 16 AND 20 GAUGE.

Perfect workmanship. Thoroughly guaranteed. A popular gun at a popular price.

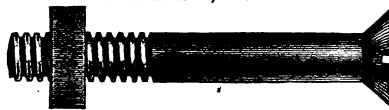
Packed in pasteboard boxes for hardware trade. Comes apart without the aid of tools.

Send for Circular and New Prices.

HULBERT BROS. & CO.,

26 WEST 23d ST., NEW YORK.

WHEN IN NEED Address **MOUNT CARMEL BOLT CO.,**
MOUNT CARMEL, CONN.



DIRECTIONS FOR USING

WILLIAMSON'S NEW POWER CORK SCREWS.
KEEP ON TURNING, DO NOT PULL.

No. 1243, Nickel Plated, Apple Wood Handle,
1443, " " Rosewood

\$5.00 per dozen.
5.50

For Discounts and Prices of other styles send for Catalogue.

C. T. WILLIAMSON WIRE NOVELTY CO., NEWARK, N. J.

Manufacturers of Wire Specialties for the Trade.



PRICE ISSUES OF 1894 WILL BE MET.

Special ADVANCE Proposition

FOR THE

Hardware Trade.

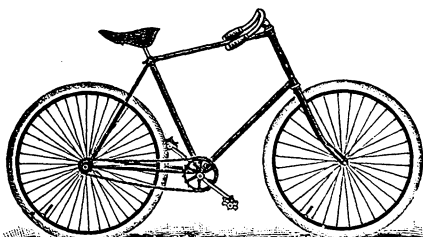
Samples (only) '94 Lines Ready for Delivery.

New Lines, New Features, New Patterns.

OUR SIXTH YEAR.

THE EAGLE BICYCLE MFG. CO.,

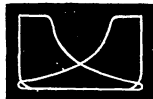
Makers of Highest Grade Bicycles, Torrington, Ct



EAGLE ALUMINUM RIMS (Patented).

A 24 lb. Guaranteed Road Wheel.

Highest Grade. Correct Design.



MAKE YOURSELF A

Mechanical Engineer or Draughtsman; or qualify to take charge of, or to superintend the manufacture of machinery by devoting your idle hours to **Home Study** by the method of **THE CORRESPONDENCE SCHOOL OF MECHANICS**, Scranton, Pa. To begin, students need only know how to read and write. Moderate Charges. Send for **FREE Circular**.

EXPERIMENTAL ELECTRICITY.

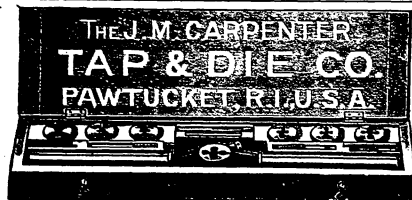
By EDWARD THEVERT.

Illustrated. - Cloth. - \$1.00.

CONTENTS—Some Easy Experiments in Electricity and Magnetism; How to Make Electric Batteries; A Galvanometer; An Induction Coil; An Electric Bell; A Magneto Machine; A Telegraph Instrument; An Electric Motor; A Dynamo; Electric Bell Fitting and Gas Lighting; Electric Lamps; Electric Terms.

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade St., New York.



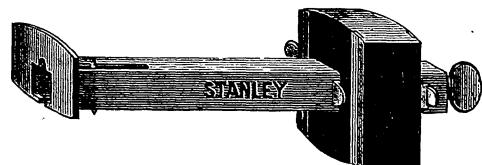
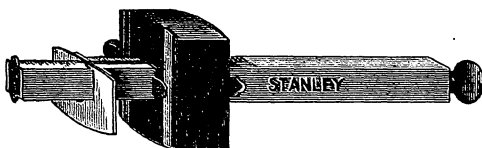
THE J. M. CARPENTER TAP & DIE CO. PAWTUCKET, R. I. U.S.A.

Electric Toy Making, Dynamo Building and Electric-Motor Construction. By T. O'CONOR SLOANE, A.M., E.M., Ph.D. This work treats of the making at home of electrical toys, electrical apparatus, motors, dynamos, and instruments in general and is designed to bring within the reach of young and old the manufacture of genuine and useful electrical appliances. The work is specially designed for amateurs and young folks. Very fully illustrated. \$1.00

For sale by David Williams, 96-102 Reade St., N. Y.

Stanley's Butt and Rabbet Gauge.

FOR HANGING DOORS, MORTISING, MARKING, ETC.



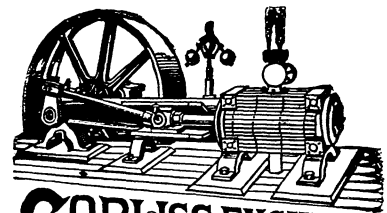
No. 92. Improved Butt and Rabbet Gauge. \$1.25

STANLEY

RULE & LEVEL CO.

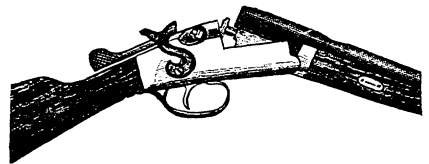
New Britain, Conn.

SOLD BY ALL HARDWARE DEALERS.



CORLISS ENGINES
MACHINISTS
IRON FOUNDERS, BOILER MAKERS,
ROBT. WETHERILL & CO.
CHESTER, PA.

GUNS



AGENTS FOR THE

Forehand & Wadsworth

SINGLE-GUN
TOP SNAP ACTION.

Best Gun made. Sold very largely by the Hardware Trade.

Special prices to the trade. Also all grades Double Guns.

WM. READ & SONS,

107 WASHINGTON ST., BOSTON, Mass.

ESTABLISHED 1826.

AMERICAN WHIPS

If you sell whips send for price on 10 Americans, our special assortment for hardware dealers. A complete line in one lot.

AMERICAN WHIP CO.,

WESTFIELD, MASS.

If you want

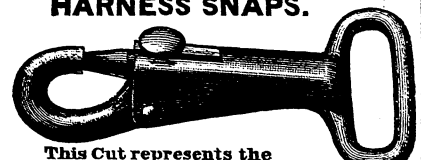
A Regulator

Of any kind or for any purpose, write the

MASON REGULATOR CO.,

BOSTON, MASS.

THE W. & E. T. FITCH CO.,
NEW HAVEN, CONN.
Manufacturers of a variety of
HARNESSE SNAPS.



This Cut represents the
UNION PAT. BOLT SNAP.

PAUL S. REEVES,
Philadelphia.
Phosphor Bronze
AND
BABBITT METALS.

Lead Lined Car Bearings a Specialty.

Brass and Phosphor Bronze Castings from $\frac{1}{4}$ pound to 20,000 pounds in weight.

STANDARD STEEL CASTING CO.
THURLOW, PA.
STEEL CASTINGS
QUALITY EQUAL TO STEEL FORGINGS

ESTABLISHED
Spring Making, 1842. Steel Making, 1845.
Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND,
MANUFACTURERS OF
Springs, Steel, Re-Rolled Norway
Iron & Slit Norway Nail Rods.

Address FRANKFORD P. O., PHILADELPHIA

BURGESS & LOXLEY,
Malleable Iron and Small Steel Castings.

MILITARY ROAD & CHANDLER STREET.
BUFFALO, N. Y.

DAYTON
MALLEABLE
IRON CO.
DAYTON, O.
HIGH CLASS
CASTINGS A SPECIALTY.

NORWAY IRON RIVETS.
FOR ALL PURPOSES.
WRITE FOR PRICES
TO
THE BOYCE RIVET CO.
MUNCIE, INDIANA.

Spon's Tables and Memoranda for Engineers.
11th edition (vest-pocket edition). 140 pages, flexible leather. \$0.40
For Sale by David Williams, 96-102 Reade St., N. Y.

BUFFALO
FORGES
BLOWERS, EXHAUSTERS
HEATING FURNACES
HAND BLOWERS
BLACKSMITH DRILLS
BUFFALO FORGE CO.
BUFFALO, N. Y.

STANLEY G. FLAGG & CO., Philadelphia, Pa.
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.
Manufacturers of **STEEL CASTINGS,**
A Substitute for Steel and Wrought Forgings.
Circulars Sent on Application.

Butcher Saw Blades.

See Page 62.

MILLERS FALLS CO.

93 Reade St., New York.

EUREKA CAST STEEL COMPANY.
Office and Works, Chester, Pa.
Open Hearth, Crucible and Eureka Steel Castings.
Railroad and Machine Castings.
Locomotive Cross-Heads and Gearing a Specialty.
Guaranteed Knuckles for M. C. B. Couplers.

SPRINGS AND AXLES
ROLLING MILL.
F. W. WURSTER & CO.
375 Kent Ave. Brooklyn N. Y.

All Kinds and Sizes of Taps made of the Highest Quality of Steel with Great Care.



Also Dies, Reamers, Screw Plates, Screw Cutting Machinery, &c. Send for new catalogue.

WILEY & RUSSELL MFG. CO.,
Greenfield, Mass.

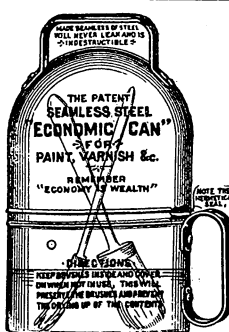
STEEL TUBES
WELDED
JOHN S. LENG'S SON & CO., NEW YORK.

LIDGERWOOD
HOISTING ENGINES.

300 styles and sizes. Over 9500 in use.

LIDGERWOOD MFG. CO., 96 Liberty St., N. Y.

JOHN SOMMERS' "O.K." FAUCETS
WARRANTED 1ST QUALITY
MADE OUT OF SELECTED ROCK SUGAR MAPLE
SATURATED IN INDIA RUBBER
THAT LEAVES NO TASTE OR SMELL AND MAKES THE FAUCET IMPERVIOUS
ONLY THE GENUINE ARE STAMPED IN THE WOOD WITH OUR TRADE MARK
CROSS AND BEAR YELLOW LABEL
JOHN SOMMERS' SON, M'FR, 8-12 PEARL ST. NEWARK N. J.



THE WILMOT & HOBBS MFG. COMPANY,
20 Murray St., NEW YORK.

THE "ALWAYS READY"
"ECONOMIC" CAN.
For Paint, Varnish,
Shellac, &c.
The hermetical seal
preserves the
brushes and contents.
No more Dry or Hard
Brushes.
No more Paint Skins
and Drying up of
Contents.

This can commends
itself at once to Paint-
ers, Pattern and Cab-
inet Makers, and all
who use fine Paints,
Varnish, Shellac, etc.

RUSSELL, BURDSALL & WARD,
Portchester, N. Y.,
Manufacturers of
Carriage, Tire, Plow and Stove
BOLTS

Carriage Bolts made from Best-Square Iron a Specialty.

Solid Steel Castings

From Crucible and Open Hearth.

Steel and Gun Metal Rolls
Specialties.

Air Furnace Refined
Malleable Castings.

ISAAC C. JOHNSON & CO.,

ESTABLISHED 1853,

SPUYTEN DUYVIL, NEW YORK CITY.

**DOG COLLARS,
DOG MUZZLES.**

THE
CHAPMAN
MFG. CO.,
Meriden, Conn

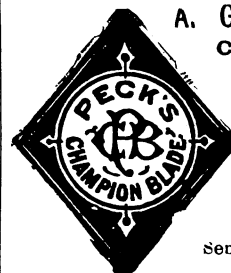


A. G. PECK & CO.,
Cohoes, N. Y.

MANUFACTURERS OF

**AXES, ADZES
BROAD AXES
HATCHETS.**

Send for Catalogue and
Price List.



CASTINGS.

Light Machine and
small gray iron cast-
ings of superior qual-
ity. We have excep-
tional facilities for pro-
ducing fine work.

Prices reasonable.

VAN WAGONER & WILLIAMS CO.

Cleveland, Ohio.

Published by **DAVID WILLIAMS, 96-102 Reade Street,**
New York. Printed by **THE WILLIAMS PRINTING**
Co., General Book, Commercial and Newspaper
Printers and Binders, Nos. 96 102 Reade St.,
New York.

THE IRON AGE

THURSDAY, SEPTEMBER 28, 1893.

The Forter 40-Ton Ladle Crane.

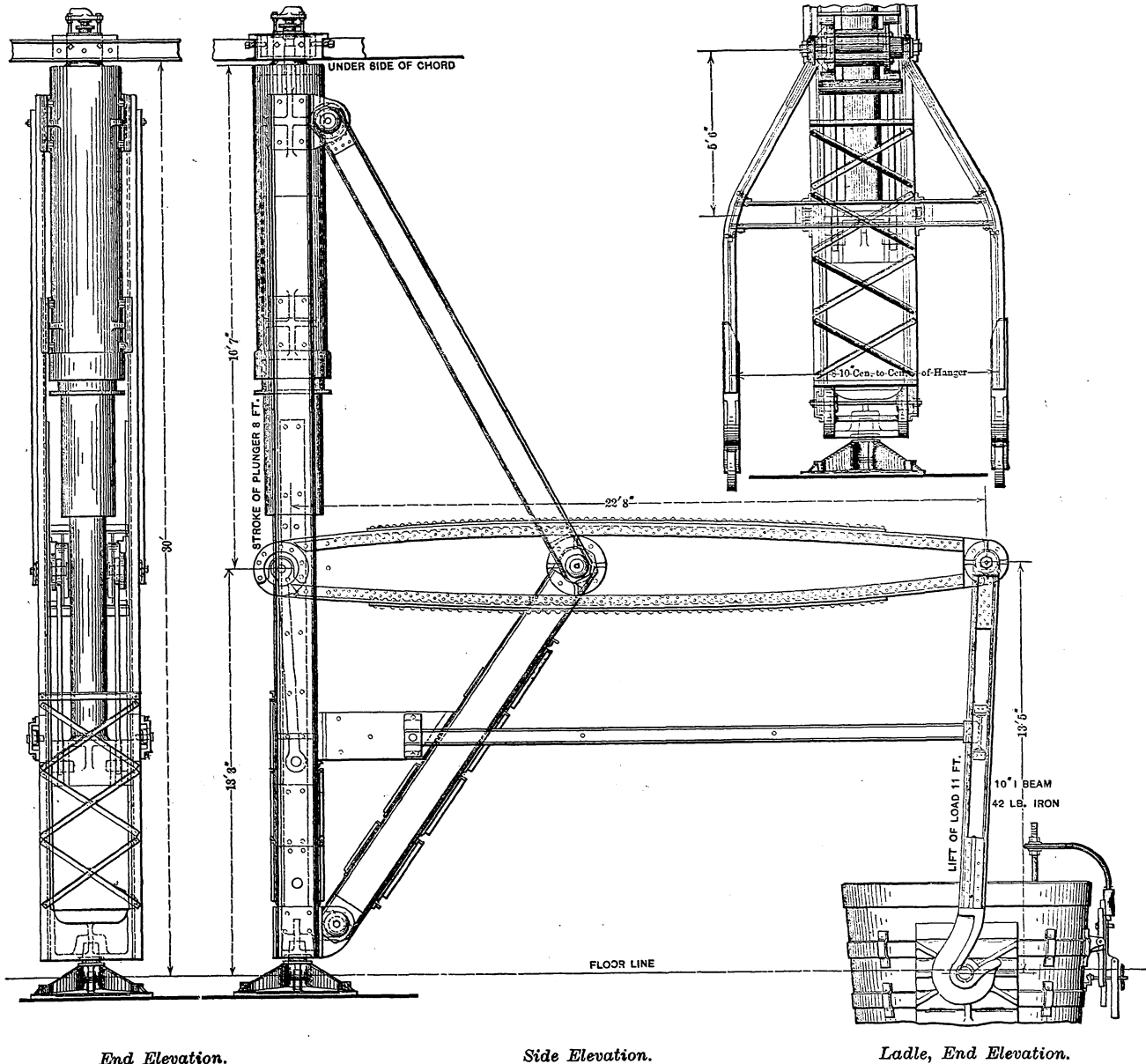
The Pittsburgh Iron and Steel Engineering Company have just completed a 40-ton hydraulic ladle crane which embodies a number of features different from the styles of hydraulic cranes commonly used for similar purposes.

The crane was built from designs of S. Forter of the above company and

bars, is rotary and is stepped in a socket or base-plate at its lower end; the lifting cylinder is bolted between the mast beams at the top end and has the top pivot cast on, through which the water inlet is arranged by means of a common stuffing box; the plunger projects through the lower end of the cylinder and bears on a cross head which slides on guides between the mast channels.

counterlines intersect the centers of bottom and top pivots, respectively, thus avoiding any bending strain on the mast.

It is evident that in consequence of this construction the mast can be made very light. In other cranes where jib and braces are connected to the mast at points intermediate between top and bottom trunnion, the masts require to be very heavy to withstand the great



End Elevation.

Side Elevation.

Ladle, End Elevation.

THE FORTER 40-TON LADLE CRANE.

has been erected at the new extension of the open-hearth furnace plant of the Carbon Steel Company, Thirty-second street, Pittsburgh.

The points aimed at in this design are: Reduction of power in operating the crane by doing away with the dead load, which in cranes of so large a size is quite an important factor; reduction of the friction of the moving parts to a minimum; to arrange the different parts so that the mast is not subjected to a bending strain; the mast of the crane consisting of two, 15 inch channel

Two links connect the cross head with the rear end of the oscillating jib beam, the other end of the jib carries the hangers and hooks to receive the ladle.

The jib beam consists of a box girder built of steel plates and angles, and is pivotally supported by means of a strut consisting of two 15 inch channels and leading from the bottom casting of the mast, and a brace consisting of two 12-inch channels, and which extends from the jib pivot to the upper part of the cylinder. The strut and brace are connected to the mast in such a manner that their

bending strain to which they are subjected. By reference to the cut it will be seen that the parts connected to the rear end of the jib, plunger, cross head, &c., move in opposite direction to the parts and load on the front end. By reason of this arrangement all dead load can be perfectly balanced. The proportion of the front and rear arms of the jib are here so determined that the hangers, hooks and ladle without lining are balanced, whereas the ladle with the lining will sufficiently over-balance plunger, cross head and links to

allow it to descend to its lowest position ready to receive the metal from the furnace. A glance at the cut will show at once that the loss of power through friction on this crane is reduced to a minimum.

The radius bar, which extends from a point back of the strut to the hanger, serves to steady the load.

This crane will lift 40 tons of metal on the ladle or a total load of 50 tons on the hooks at a water pressure of 450 pounds per square inch. The parts are very carefully calculated for strength, with a factor of safety of not less than five.

Manganese Steel.

A new use for manganese steel, the invention of R. A. Hadfield of Hadfield's Steel Foundry, Attercliffe, England, is reported to be exciting considerable interest on the other side of the Atlantic. The *British Trade Journal* says that shovels, spades and forks of manganese steel are now being manufactured in England, the toughness and durability of the metal being found to render it exceptionally useful for this purpose. The Hadfield Foundry Company are reported to possess two dredger pins, one made of ordinary carbon steel and the other of manganese steel. The carbon dredger, after three months' wear, was reduced over 1 inch in diameter; the manganese dredger, after three times longer wear, was not worn more than $\frac{1}{8}$ inch. For parts of crushing machinery, as well as for parts of dredgers besides pins, manganese steel has been found well adapted. A pair of edge rings of manganese steel, after crushing 400 tons of material, show less wear than a pair of cast-iron rings that have crushed only 100 tons of similar material. Manganese, though containing about 87 per cent. of iron, is almost non-magnetic. Electricians have discovered that it is equally well adapted for resistance coils, offering double the resistance to the electric current done by platinoid or German silver.

Concerning the recent decision of the Ordnance Department of the United States Army to transfer the foundry department from the Watervliet, N. Y., arsenal to the arsenal at Watertown, Mass., Major Arnold, commandant at the Watervliet arsenal, says that this is in accord with the policy of the Department to have each arsenal manufacture in one line. The foundry at Watervliet had been operated with few employees several months and the removal of that portion of the plant to Watertown was no surprise. The Watervliet arsenal was a gun factory, and the manufacture of projectiles was only a small feature of the plant. At the Watertown arsenal are constructed gun carriages for seacoast guns and all kinds of projectiles. The Ordnance Department has decided that it would be unwise to continue the manufacture of projectiles and carriages at Watervliet. The Springfield, Mass., arsenal is for the manufacture of small arms and that at Watervliet a gun factory for the construction of all the seacoast, siege and field guns. At the Frankfort arsenal small ammunition is made, and at the Rock Island arsenal gun carriages, limbers and caissons, and here also are made equipments for the infantry and cavalry.

The Bessemer Process as Conducted in Sweden.—I.*

BY PROF. RICHARD AKERMAN, STOCKHOLM, SWEDEN.

At the international sessions of the Iron and Steel Institute of Great Britain, the American Institute of Mining Engineers and the Verein Deutscher Eisenhüttenleute, held in Allegheny City, Pa., in October, 1880, Sir James Kitson, then president of the Iron and Steel Institute, presented an account by Sir Henry Bessemer of the origin of the process which bears his name.† The paper graphically told how, after the first successes immediately following the first reports given at Cheltenham of the new process, there rapidly succeeded such obstacles and difficulties in its practical application, that the whole matter was nearly abandoned in 1858. Suddenly, however, the situation changed, so that at length it became possible to produce by the Bessemer process, with comparative uniformity, a completely satisfactory product. But Sir Henry Bessemer did not touch with a single word upon the question, what caused the change. He merely said:

"Happily for me the end [of his mental anxiety] was nigh, and in a few more months I had fully succeeded in producing steel worth from £50 to £60 per ton from charcoal pig iron which had cost me only £7 per ton, the conversion of the crude iron into steel being effected by simply forcing minute streams of cold atmospheric air upward through it for a space of 15 minutes."

It is no more than just to mention here that the fortunate turn in affairs was brought about, substantially at least, by a Swede, Consul G. F. Goransson, who as early as 1857 had begun his experiments with the Bessemer process at Edske blast furnace. Until the middle of 1858, he, like Sir Henry himself, had succeeded only exceptionally in turning out a good product while following the advice of the inventor to lay the greatest weight on having a high pressure of blast. By departing from that advice, and securing instead, by means of a large tuyere area, an abundant supply of blast, Goransson was able, beginning with July 18, 1858, so to shorten the time necessary for the process and thereby increase the heat of the blow, that an improved product was obtained, and from that day forth the success of the Bessemer process was first assured. Before this, at least at Edske, the blows had generally run too cold, so that the product originally became so thick that two classes of serious trouble occurred. In the first place, the slag could not properly separate from the metal, but remained partly in nodules in the ingots. Because the steel was insufficiently fluid, the ingots were heterogeneous, being harder in some parts than in others. Moreover, they were unduly filled with blow-holes, which were too often oxidized, so that they could not be effaced by welding. In the second place, great waste was occasioned by the excessive quantity of steel, even as much as one-half or more, which solidified in the ladle and had to be treated as scrap.

One condition which materially aided Mr. Goransson in making regularly a

* Read before the American Institute of Mining Engineers. Translated by Philip W. Moen and Emanuel Trotz, Worcester, Mass. Chicago meeting, being part of the International Engineering Congress, August, 1893.

† *Trans.* xix, 810.

good Bessemer product was the freedom of his material from phosphorus and sulphur. The Swedish experiments first clearly showed that the Bessemer process, far from removing phosphorus in a higher degree than the older processes, as its sponsor had hoped at the outset, had, on the contrary, greater need of materials low in phosphorus than any of the older methods; and after the trials at Edske had been crowned with the success mentioned, Swedish pig iron only was used for two years at Sir Henry Bessemer & Co.'s works in Sheffield, in making tool steel.*

The relative freedom of the Swedish pig iron from sulphur was of further aid in making the Bessemer steel produced from it less liable to red-shortness than that prepared from other pig irons. The latter appeared to need so urgently an addition of manganese for the removal of red-shortness, as to induce the general belief that the Bessemer process first came to be practicable through the additions of manganese introduced by R. Mushet. The exaggerated character of this opinion may be readily inferred from the fact that, at some of the Swedish Bessemer works, no addition whatever of either *spiegel* or ferromanganese is made for the best steels; while at other Swedish works, where such an addition is employed, it is confined to an insignificant quantity, compared with what is used in the majority of Bessemer works in other countries. But this circumstance is by no means entirely due to the small tenor of sulphur in the Swedish pig irons. As will be shown later on, it stands quite as much in connection with the fact that such Swedish pig irons as require little or no addition of manganese at the close of the process, carry proportions of silicon and manganese suited to the purpose for which they are to be used.

Mr. Goransson's plan included the taking of pig iron, without remelting, direct from the blast furnace to the converter. This practice was followed at Edske from the beginning of 1857 and has been continued ever since at all the other Swedish Bessemer works. The experiments made at two works, about 1870, in using remelted pig iron, speedily showed that the product derived from such material was both costly and inferior to that made from molten pig iron taken direct from the blast furnace. It was not, therefore, at Terre Noire in France, as has often been stated, but in Sweden that the taking of pig iron direct into the Bessemer converter without remelting was first practiced. Moreover, it was done in pursuance of the Swedish example, in Carinthia and Styria, before there was a Bessemer plant at Terre Noire.

The plan adopted in Sweden from the beginning, of taking the pig iron direct from the blast furnace, was accompanied with difficulties, more particularly at the outset, because it was essential that the blast furnaces working on Bessemer pig should steadily produce a pig iron of suitable composition. Although it is now generally known in our Bessemer works that the art of getting a Bessemer plant, arranged in the Swedish manner, to work satisfactorily consists principally in a proper management of the blast furnace to that end, it was a long time before not only the importance of this was seen, but the best way to accomplish it was learned.

The silicon in our forge irons was

* See Sir Henry Bessemer's above-quoted description in *Transactions A. I. M. E.*, xix., 827.

generally between 0.2 and 0.4 per cent.; but such pig iron was unfit for the Bessemer converter, as it would make the blow too cold. On the other hand, as long as the blowing engines lacked the necessary power it became evident that pig iron with more than 1 per cent. silicon caused an equally cold blow on account of the unreasonable prolongation of the process. After 1870, when the Swedish Bessemer works had at length secured blowing engines of requisite strength, it was found best for the quality of the product to run the blast furnaces so that the Bessemer pig should contain from 0.9 to 1 per cent. of silicon.

While in other countries pig iron containing from 2 to 3 per cent. of silicon has been chiefly used, most Swedish Bessemer works have never desired more than 1 per cent. of silicon, but they have wanted at the same time 1.5, or, better still, from 2 to 4 per cent. of manganese. This, together with about 4.5 per cent. of carbon, and the greatest possible freedom from phosphorus, sulphur, copper and arsenic, is the chemical composition desired for Swedish Bessemer pig iron; but it is essential, besides, that when tapped from the blast furnace it should be thin and "hot," otherwise, with so little silicon, especially when the proportion of manganese is not particularly great, the blow in the Bessemer converter will be "cold," or rather, not sufficiently hot.

With charcoal for fuel, and with as thorough and careful a roasting as is ordinarily given to the ore in Sweden, the charges of the Swedish blast furnaces contain, as a rule, but a trifling amount of sulphur; and there is, therefore, unlike the practice in coke blast furnaces, no necessity for any special effort to remove sulphur in the blast furnace. In other words, the condition so unusual in other countries obtains in Sweden, that it is generally unnecessary to keep the temperature in the blast furnace any higher on account of sulphur than is needful to effect reduction and a regular working of the stack.

The cheapest way of producing, under the Swedish conditions named above, a pig iron containing 0.9 to 1 per cent. silicon, is to so arrange the charge that, with alumina considered as a base, the slag would be about a 2.5-silicate. With a charge in which the metallic iron does not exceed 50 per cent. there would then be required only a slight excess of heat to obtain a pig iron with the silicon ratio in question, and it could be produced with but little larger consumption of charcoal than would be necessary, with the same charge and temperature of blast, merely to maintain regular running. But such a pig iron when run from the blast furnace would be "cold," and would not give a sufficiently warm blow in the converter; and it therefore becomes necessary for Bessemer uses, even with that kind of charge, to keep the blast furnace running with an excess of heat. As a still further consequence, the pig iron has a tendency to contain more nearly 2 than 1 per cent. of silicon, and perhaps even more; and this higher silicon, in its turn, contributes to a warmer blow in the converter.

There are, indeed, some Swedish Bessemer works which, to gain a cheaper product in producing iron or soft steel for ordinary purposes, use a pig iron made with an acid blast-furnace charge, and hence low in manganese, and containing usually about 2 per cent. of silicon. This acts in the Bessemer converter about the same as the Bessemer

pig irons generally used in other countries, in that it yields a sluggish slag, and requires, after the close of the blow, an addition of manganese, which is large in comparison with the ordinary practice in Sweden. Such conditions constitute in this country not the rule but the exception; and it is not that kind of Bessemer process, but that which is typical of Sweden, which alone will be the subject of this paper, and which alone is under consideration in what follows.

All ingot metal is divided in Sweden into two classes: steel, high in carbon and capable of hardening; and iron, low in carbon and incapable of hardening. Since, as this paper shows, Swedish Bessemer metal contains relatively small quantities of such impurities as manganese and silicon, it is the percentage of carbon alone which fixes the limit between steel and iron. This limit is said to be at 0.40 per cent. of carbon—all ingot metal with higher carbon being called steel, and all with lower carbon, iron.

For the Bessemer pig ordinarily made in Sweden, a basic, not an acid, charge is used, with a slag which (alumina being reckoned as a base) usually lies between a 1.5 and a 1.2 silicate. The reason for this is, in the first place, that the more basic the charge is kept the greater excess of heat must there be (especially as our charges are low in alumina) in the production of pig iron, if it is still to contain the desired amount of silicon (0.9 to 1 per cent.); and so much the hotter will it be when it comes to the converter. This is all the more necessary because, on the one hand, the pig iron is so low in silicon. On the other hand, on account of the long interval between the blows, and also because the charges with us are so small (mostly between 3 and 4 tons), the converter is generally by no means as warm when the pig iron is turned in as is most often the case in other countries. Another reason is that the supply of highly manganiferous ores is smaller than that of those poorer in manganese, and, as is well known, more of the manganese of a charge enters into the pig iron, when, other things being equal, the charge is kept more basic. Moreover, most of our more manganiferous ores are rich in lime and not seldom contain pyrites; and since it is more difficult to completely remove sulphur by calcining from calcareous than from siliceous ores, our more manganiferous charges often stand in need of a greater basicity and, at the same time, a hotter run in the blast furnace, on account of the sulphur. Finally, it seems probable that a more basic charge co-operates in obtaining the higher percentage of carbon (4.5 per cent.) which is desired in the pig iron.

With the small production of our blast furnaces there can be, of course, no thought of equalizing the composition of the pig iron by some arrangement more or less similar to Jones' pig-iron mixer; and hence it becomes all the more necessary to endeavor by the most careful furnace management to maintain that uniformity in running which is indispensable to good results in the use of direct metal in the converter. Great uniformity in the running of the blast furnace is thus the end most earnestly sought at the Swedish blast furnaces; and this circumstance, in connection with low wages and the limited market for products of the highest class (such as are chiefly considered in this paper), constitutes the principal reason for the comparatively slight importance attached in Sweden to large output. It

is, however, at the Bessemer blast furnaces, not enough to keep a good and uniform run with the same kind of charge. Some Bessemer works change their blast-furnace charges to produce steel of different grades of hardness, experience having shown that a charge most suitable for a certain purpose is not necessarily equally well adapted to another.

This question stands in closest connection with C. A. Caspersson's plausible explanation concerning the influence which the heat during the Bessemer process has on the presence of blow-holes in the ingots. By close observations, made during many years, to ascertain the relation between the composition of the pig iron and the conditions of the blow, with special regard to the temperature, and also by breaking ingots from each observed blow, to determine the appearance and position of the blow-holes, Mr. Caspersson was at last able to predict with certainty, from the known composition of the pig iron and the nature of the blow, the character of the ingots as regards blow-holes.*

In this way Mr. Caspersson found that extremely "cold" blows, the temperature of which is designated as No. 0, give ingots which are full of blow-holes from the surface to the middle, and consequently unserviceable. Good ingots are not obtained until a so much higher temperature (No. 1) is reached that the blow-holes are limited to a belt not less than a couple of centimeters ($\frac{1}{2}$ inch) from the surface of the ingots. Blow holes in this place do much less harm than those which, with however small an opening, reach the surface of the ingots. The former do not oxidize as the latter do, and are therefore more easily welded. Moreover, defects in the surface of ingot metal generally cause greater harm than similar defects farther in.

The temperature now in question, or temperature No. 1, is the most common in making Swedish Bessemer steel, and for this reason ingots with a belt of blow-holes, which have no opening to the surface, are those most common here. Since the announcement of Mr. Caspersson's researches, we have in Sweden, more than in other countries, made it a study to avoid the next higher range of temperature (No. 2), as it occasions blow-holes situated so near the surface that they come in contact with the air, and in consequence become oxidized. These surface blow-holes, are, to be sure, very often smaller than those situated somewhat deeper, and caused, as mentioned, by the next lower temperature; and ingots of Bessemer metal at the higher temperature now in question contain, therefore, generally fewer blow-holes than any of those previously described. But since, as has been said, even the finest surface blow holes are far more injurious than considerably larger blow-holes lying a little farther in, the former should always be carefully avoided.

A somewhat higher temperature (No. 3) gives ingots comparatively solid, both at the surface and toward the center, and is therefore desirable, particularly for steel high in carbon, where the belt of blow-holes is still more difficult to weld than in ingot iron lower in carbon. At a still higher heat (No. 4) the ingots certainly continue to remain comparatively free from blow-holes, or rather become more and more so, but

*See *Jernkontorets Annaler*, 1882, p. 295. In translation, *Stahl und Eisen*, 1883, p. 71; and in summary, *The Journal of the Iron and Steel Institute*, 1883, No. 1, p. 480.

begin simultaneously to suffer from "piping," which grows more troublesome as the heat is increased.

The changes in the state of the blow-holes in ingots, to which reference has been made, and which are caused by differences in temperature, hold good, however, only for ingots of the same hardness. In a metal with a higher percentage of carbon, as is well known, the melting point becomes lower, and as the temperatures above discussed really indicate different amounts of surplus heat above the melting point, it is natural that the amount of heat which with soft iron, for instance, scarcely suffices for temperature No. 1 and gives ingots with blow-holes, should give, for harder iron and soft steel, temperature No. 2 and ingots with surface blow-holes, and for hard steel, temperature No. 3 and comparatively sound ingots. The temperatures described above are, in other words, by no means absolute, but relative, varying with the desired hardness of the product, because the absolute temperature corresponding to a given temperature number increases as the product becomes softer.

As has been mentioned already, relatively little or no manganese is added at the end of the blow at most Swedish Bessemer works. Recarburizing is accordingly insignificant, especially as ferromanganese has latterly been used here much more than spiegeleisen, and the blows in Sweden are therefore oftener made more or less "direct," that is, they end as soon as the carbon has been reduced to the amount wanted in the product, or very little below. This method, peculiar to Sweden, is preferred to the one sometimes formerly practiced here—namely, recarburizing with pig-iron, which was added in a molten state, together with iron rich in manganese. The reason for this preference is that Bessemer works having proper control of the blast furnaces succeed, in the manner first mentioned, in getting a better and more even product than by recarburizing. One essential condition, however, is that the amount of silicon in the pig iron must not materially exceed 1 per cent., for in that case one might easily (especially in making hard steel, where the blow has to be ended earlier) run the risk of a large percentage of silicon; whereas, as the conditions with us now generally are, silicon is mostly below 0.1 and very often not above 0.05 per cent. In those exceptional cases where pig iron with about 2 per cent. of silicon is used recarburizing with pig iron is also generally employed.

It is the above-mentioned conditions that furnish the principal reason for keeping the blast furnace charge at typical Swedish Bessemer works, the more basic, the hotter the Bessemer operation is desired to be. But this does not prevent hard steel from being richer in silicon when produced with temperature No. 3 than with No. 1; for even if no addition is made at the end of the process, the percentage of silicon in the final product is, as is known, not dependent exclusively upon that in the pig iron, but also upon the temperature of the blow. For no material does the tendency to oxidize increase more with a rise of temperature than for carbon, and if the blow is stopped when the amount of carbon is reduced to only 1 per cent., the percentage of silicon in the steel may be 0.15 per cent. if the grade of heat during the blow has been about No. 3, while it amounts to but 0.04 or 0.05 per cent. in a steel of the same grade of hardness, if produced from a pig iron

almost alike in silicon, but made from a less basic charge, and hence carrying so much less surplus heat, that the temperature during the blow remained about No. 1.

As a rule, Bessemer ingot iron and soft steel containing less than 0.6 per cent. of carbon cannot be produced advantageously except with temperature No. 1, and ingots of these grades of hardness have consequently a belt of blow-holes; for it is only exceptionally that the heat can be so raised, even for soft steel, as to reach No. 3, and the intermediate temperature No. 2, with its injurious surface blow-holes should, of course, always be avoided. On the other hand, hard steel is produced with a temperature which corresponds to No. 1 as well as to No. 3, and temperature No. 3 is for very hard steel with 1 to 1.4 per cent. of carbon the same as No. 1 for iron with 0.2 per cent. of carbon. Likewise for steel with 0.6 to 1 per cent. of carbon there can be used both the temperature No. 3, giving sound ingots (temperature No. 3 for such steel being the same as No. 2 for soft steels, with its undesirable surface blow-holes), and also temperature No. 1 with its belt of blow-holes; but the latter temperature is, on the other hand, entirely insufficient for producing ingot iron, and causes even for soft ingot steel bad blow-holes all through.

As ingots produced at temperature No. 3 become comparatively sound, many might be led to expect that all grades of hardness from 0.6 per cent. carbon up should be made at temperatures corresponding with No. 3. This is, however, by no means the case; on the contrary, it is more usual for harder steel, as well as for ingot iron, to employ temperature No. 1. The reason for this is that No. 3, as compared with No. 1, leaves in the product not only primarily a larger percentage of silicon, but also a larger percentage of manganese. As the amount of these materials naturally becomes still greater in Bessemer products produced at temperature No. 4, and ingots thus prepared have, moreover, the disadvantage of being "piped," it is a matter of course that temperature No. 4 is used still less than No. 3. An effort to reach it is made, however, when a perfectly sound ingot is of particular importance, though in such a case the upper part of the ingot, with its "pipe," has to be sacrificed.

In the conditions thus stated must be sought the reason why, at the same works, the blast furnace charges are sometimes changed somewhat for making different grades of steel. When the greatest importance is attached to soundness of the product, a more basic charge is used for steel with 0.6 per cent. of carbon and over than for softer products, which, if blown from the same pig iron, would have surface blow-holes. When the steel is intended for purposes very sensitive to red-shortness, a pig iron produced from an extra basic charge, rich in manganese, is used, even for the softest iron, having less than 0.15 per cent. of carbon.

The percentage of silicon in the pig iron is, as already said, generally from 0.8 to 1.1, and that of manganese varies from only 0.6 up to 6, but it is only at one or two works that it exceeds 4 per cent.

(To be continued.)

The Russian Government has decided to appoint official commercial agents not only in Central Asia, but also at the principal trading centers in America and Europe.

The Western Foundrymen's Association.

The regular monthly meeting of the Western Foundrymen's Association was held on Wednesday evening, September 20, at rooms 702 703 Temple Court Building, Chicago. A. T. Whitney was elected temporary chairman in the absence of the vice-president. The secretary read the following report of the Executive Committee on the subject of securing a chemist for the association:

"In the opinion of the Executive Committee it is advisable for the association not to accept any of the propositions presented to it, but rather to make further investigations with a view to establishing their own laboratory and securing the entire services of a chemist." The report was accepted and ordered filed.

The next business was the election of a president to fill the vacancy caused by the resignation of C. A. Plamondon. The names of George M. Sargent of the Sargent Company, Chicago, and of Charles Allis of the E. P. Allis Company, Milwaukee, had been put in nomination at a previous meeting. The secretary read a letter from Mr. Allis, declining the nomination, and a resolution was unanimously adopted empowering the secretary to cast the vote of the association for Mr. Sargent. This was done, and Mr. Vrooman and Mr. Griffin were appointed a committee to escort Mr. Sargent to the chair. Mr. Sargent made an appropriate speech, thanking the members for the honor conferred upon him, and saying he would do his utmost to further the interests of the association.

The next order of business was the election of new members, and the application of the Joliet Stove Works of Joliet, Ill., was presented, and they were elected to membership.

The secretary reported as the only unfinished business the question of securing a chemist for the association.

Mr. Vrooman suggested that the association confer with Mr. Ferguson of Fraser & Chalmers, as they had spent a large amount of money in fixing up a laboratory, and after trying it for a while had concluded that there was no use in having a chemist.

A letter from the Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, was read, asking as to what would be required of a chemist for the association and suggesting their chemist for the position. The secretary also reported having heard from the Armour Institute that they were ready to do any work that was offered to them by members of the association. Mr. Moore of the Joliet Stove Company said: "It would seem to me that in order to produce practical results a laboratory should be had of the most practical kind and with a competent chemist at its head. The one thing that attracted me to the Association of Foundrymen was the probability of forming a common laboratory. We have, in common with some other foundrymen, begun to learn that foundry iron is different from mill iron, simply because it has more silicon in it, and we have learned a few other things. The thing that we know best is that we know very little. We are anxious to get laboratory determinations at something approximating their actual cost. We cannot run a laboratory ourselves; it would cost more than the business accruing from it would pay. We have had some analyses made, taking them as it were from parties with whom we

are dealing. I think we are ready to co-operate with those who wish to start a laboratory."

Mr. Sargent: "It is a question for deep consideration. It seems to me that it should be looked into very carefully to see whether the association itself can establish and sustain a plant of this kind."

Mr. Griffin: "I think it would be a very good idea if the secretary would make an investigation among the members of the association as to whether they are willing to co-operate, and if so to what extent. We must have some basis. We must get the price of the laboratory and chemist."

It was moved and supported that the matter be referred to the secretary.

The following amendment to the by-laws was presented by Mr. Sargent,

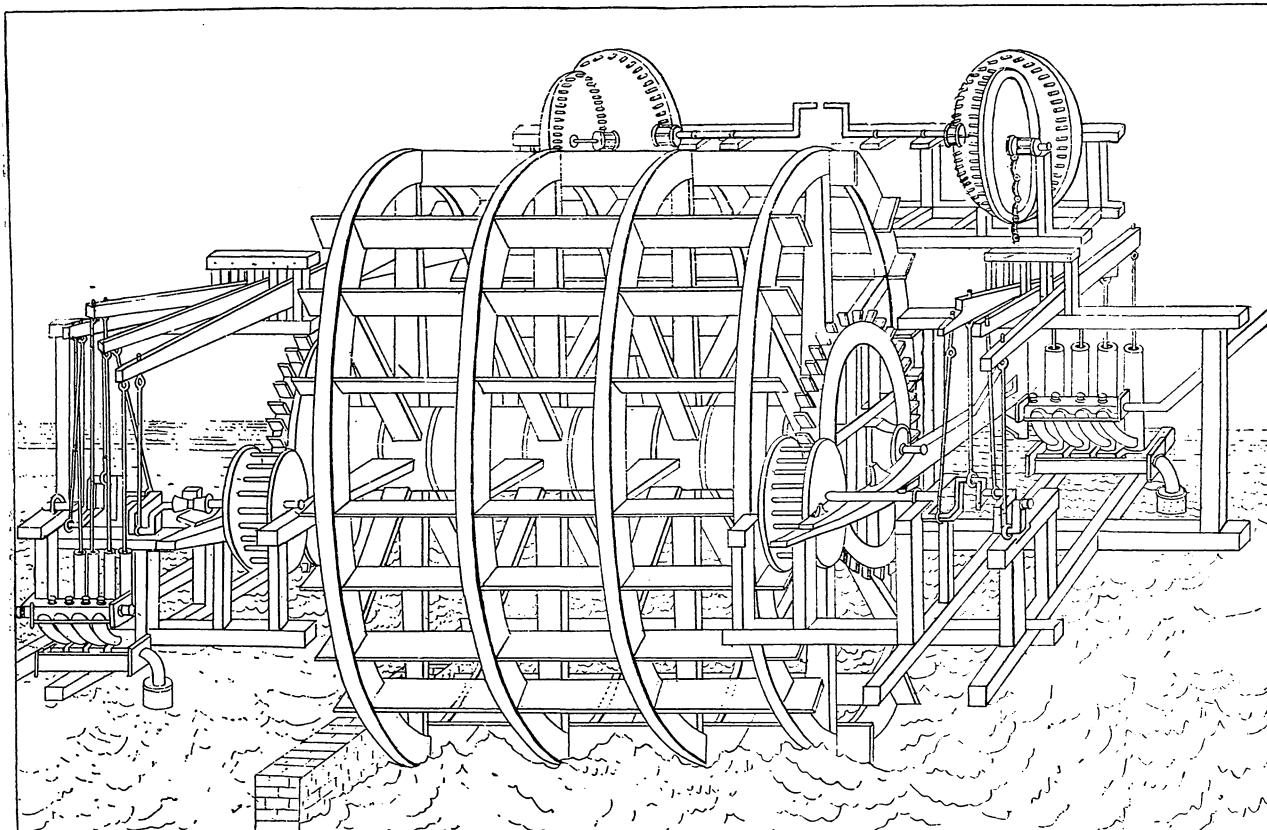
in the issue of the *Iron Trade Review* of August 17, and *The Iron Age* of August 24. A discussion then took place on the merits of the plan outlined, and action on the suggestions was deferred until the October meeting.

Old and Modern Water Works Machinery.*

BY T. W. YARDLEY, CHICAGO.

The first "lifting pump" was invented in 1425, but was limited in use until May 30, 1581, when Peter Morice was given a grant from the Lord Mayor and Commonalty of the city of London for the term of 500 years for the

him throw water over St. Magnus steeple; before which time no such thing was known in England as the raising of water." His throwing water over the St. Magnus steeple excited the wonder, as well as gratified the curiosity, of the citizens, for fire engines had not then been invented. It was not until 1663 that the force pump was used in the construction of fire engines. Prior to this all the engineering skill of the Romans, as well as the contrivances heretofore adopted for supplying London with water, had evidently been formed upon the well-known principle that water will flow along any channel that has the slightest inclination downward, but the purpose of Morice's machinery was to impel the water in an ascending direction, and thus supply water in places higher than the source.



THE LONDON BRIDGE WATER WORKS IN 1633.

to be acted upon at the next regular meeting:

"Article VIII.—All proposals for membership shall be made in open meeting by any member. The application, with the indorsement of the member making the proposition, shall be voted upon by the members present, a majority electing."

It having been suggested that the October meeting be held at the World's Fair grounds, a discussion took place as to the advisability of this plan. It was finally decided to leave the matter to the discretion of the president and secretary, and by resolution they were empowered to call the next meeting on Thursday, October 19, at the rooms of the Associated Engineering Societies, in the fair grounds, if the details could be arranged and sufficient encouragement as to the number who will attend be received from the members of the association. A paper by Thos. D. West entitled "A Plan for the Rapid Development of the Foundrymen's Association," was then read as it appeared

supplying and conveyance of water into houses by pipes from an artificial forcer from the London Bridge, on condition that the said Peter Morice should pay 10 shillings annually into the Chamber of London, and he was authorized to erect an engine within the first arch of the London Bridge for that purpose; and as this device completely effected the object, another grant was given by the same authorities for the use of another arch in the bridge. A description published in 1633 says: "The present supply of good water for London is likely to be very much enlarged by the great improvement of the water works of Peter Morice before mentioned, who being a Dutchman, in the twenty-third year of Queen Elizabeth, first gave assurance of his skill in raising the Thames water so high as should supply the upper parts of London; for the Mayor and Aldermen came down to observe the experiment, and they saw

* Read before the Milwaukee convention of the American Water Works Association.

The success of Morice's invention was so patent that the city authorities of London gave him an additional grant for two other arches under the London Bridge; this second grant was for 2000 years, and was finally secured by the New River Water Company.

In 1731 there appeared in the "Philosophical Transactions" a very minute account of the once greatly admired London Bridge Water Works, by Mr. Brighton, an engineer, who carefully described them and accompanied his detail with an engraving which had proper references for its elucidation; but whether at that time all the works were precisely the same in form and action as those first constructed, or if any improvement had been introduced, is not stated, and it may be right to premise that the water wheels and machinery being fixed in strong frames of oak, they gradually rose and fell with the tides. At that time there were three water wheels of the respective diameters of 19 and 20 feet, and 26 flat boards 14 feet long by 18 inches wide.

The pumps used had cylinders with a length of 4 feet 9 inches and an interior diameter of 7 inches above and 9 inches below the valve; the cylinders of the pumps were fixed to the top of an inclosed square iron cistern which had appropriate apertures, with valves just below the places where they were attached, these being worked by cranks which the revolving of the water wheels kept in constant motion whenever the tides were flowing either up or down the river. One wheel communicated motion to 16 pumps, and their cranks were arranged for four of them to work alternately, so that each set might draw its supply of water in succession. One turn of the wheel occasioned the whole of the pumps to make 114 strokes, and when the tide flowed quickly it produced six revolutions per minute; thus the number of strokes in that short time

upon to make "efficiency tests" of boilers, engines and pumps. From these I have extracted some facts showing the importance and value of intelligent use of fuel. I will not weary you with the entirety of these tests, nor have I permission to name the makers of the machinery, or the places where the tests were made. I will, therefore, confine myself to the fuel consumed per hour, water evaporated per pound of fuel, head and cost of fuel per ton, showing the difference in cost of fuel per month under precisely the same conditions, and also showing the difference in cost per month between intelligent firing and the opposite.

In test No. 1, the firemen were on duty six hours each during the 24 required for the test, therefore one fireman was on duty twice during the three watches of eight hours each, and under

Test No. 2.
Shawnee coal, \$8 per ton.
D..... 265 2,252 8.50 90.56 226.20
E..... 302 2,385 7.91 90.45 326.16

Test No. 3.
Indiana block, \$3.50 per ton.
F..... 368 2,453 7.32 Load 457.38
G..... 351 2,773 7.90 Constant 442.26
H..... 384 2,774 7.22 488.80

The great variety of fuel used throughout the country makes the cost of pumping vary in proportion to its quality, but the same fuel used intelligently will give much better results as to economy, and, as these figures clearly demonstrate, the value of a fireman should not be governed by a fixed rule of salary, but his compensation should be increased in proportion to his saving. As you see by the result of test No. 1, Fireman A will be a cheaper man at \$100 per month than either B or C at \$50 per month, and Fireman D shows a

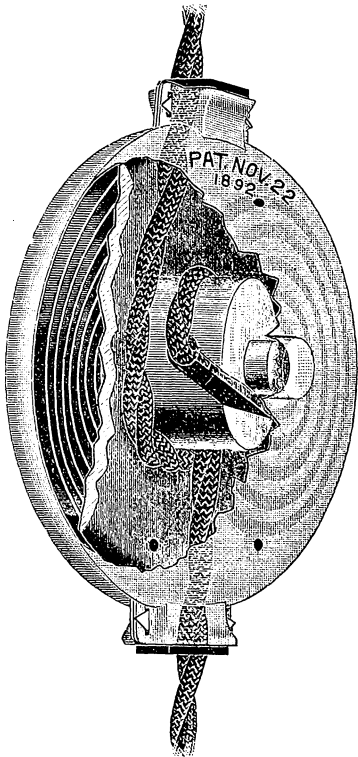


Fig. 1.

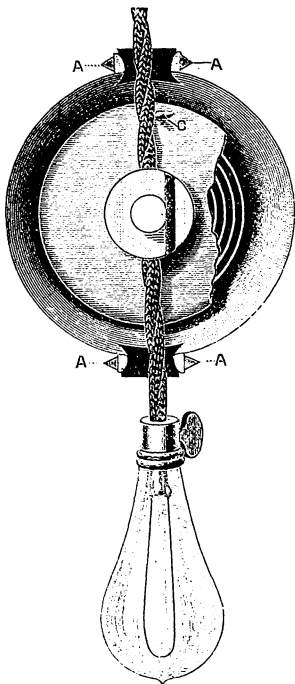


Fig. 2.

THE PORTER ADJUSTER FOR ELECTRIC LIGHTS.

amounted to 684, which raised 1954 hogs-heads of water in one hour. The accompanying sketch, taken from the engraving above alluded to, gives a good idea of the wheel and pumps of over 300 years ago, that revolutionized the method of supplying water to towns and cities to elevations higher than its source, and was the first application of piston pumps to direct pressure for the forcing of water. The principle there demonstrated of the use of non-pulsating pumps has since been developed and perfected by that eminent mechanic and hydraulic engineer, Birdsell Holly, who for many years was the mechanical engineer of the Holly Mfg. Company.

The evolution of pumping machinery has culminated in our day by propulsion with steam. What a transformation since the London Bridge Pumping Works of 300 years ago. And now, with all the improvements of boilers, engines and pumps there comes the important question of economy of fuel, and in this you are all immediately interested.

For several years past the Robert W. Hunt & Co. Bureau have been called

this division of observation and labor the result of each fireman was carefully noted. Fireman A showed a saving in fuel per month of \$76.45 on the first six hours over Fireman B, and on his second six hours he showed a saving of \$70.38 per month over Fireman C. On test No. 2, two firemen were on duty 12 hours each, and during this time Fireman D showed a saving of \$39.96 over Firemen E. In test No. 3 there were three firemen on duty eight hours each, and Fireman G showed a saving of \$16.12 over fireman F, and \$41.54 per month over Fireman H. The following tabulated statement in detail I submit for your better information :

Test No. 1.
Pocahontas coal, \$4.25 per ton.

| Firemen. | Coal per hour. | Water per hour. | Evaporation per pound fuel. | Head. | Cost of fuel per month. |
|----------|----------------|-----------------|-----------------------------|--------|-------------------------|
| A..... | 725 | 6,770 | 9.36 | 130.96 | \$1,109.25 |
| B..... | 775 | 6,777 | 8.74 | 131.25 | 1,185.70 |
| C..... | 776 | 6,795 | 8.74 | 131.31 | 1,187.23 |
| A..... | 730 | 6,805 | 9.35 | 131.56 | 1,116.90 |

saving of \$40 a month over Fireman E, and the same result is shown by Fireman G over Fireman H. These are facts worthy of your consideration, and I submit them respectfully.

The Porter Adjuster for Electric Lights.

The Porter adjuster can be easily and quickly attached without detaching the cord from the lamp socket or rosette. Fig. 1 shows the adjuster attached in position on the cord with a part of the brass shell broken away showing the wood spindle with the cord slot through which it passes with the cord in position, one flange on the wood spindle being partly broken away to show a portion of the regulating spring. Fig. 2 shows the adjuster with one-half of the brass shell removed, each of the shells being made of brass and stamped up to proper shape, one of the halves has four slots marked B and the other has four V-shaped points marked A, the wood spindle is secured to the latter so it cannot be displaced while being attached to

the cord. To place the adjuster in position the cord is pressed to the back of the slot in the wood spindle; then the shell with B slots is placed so that the four points A extend through the slots. When these points are bent down they hold the halves together firmly. The pin C is then removed and the adjuster is ready for use. The spring is regulated to the desired tension before attaching. To move the adjuster up or down on the card after being attached it is simply necessary to pull the lamp way down and move the adjuster to the proper

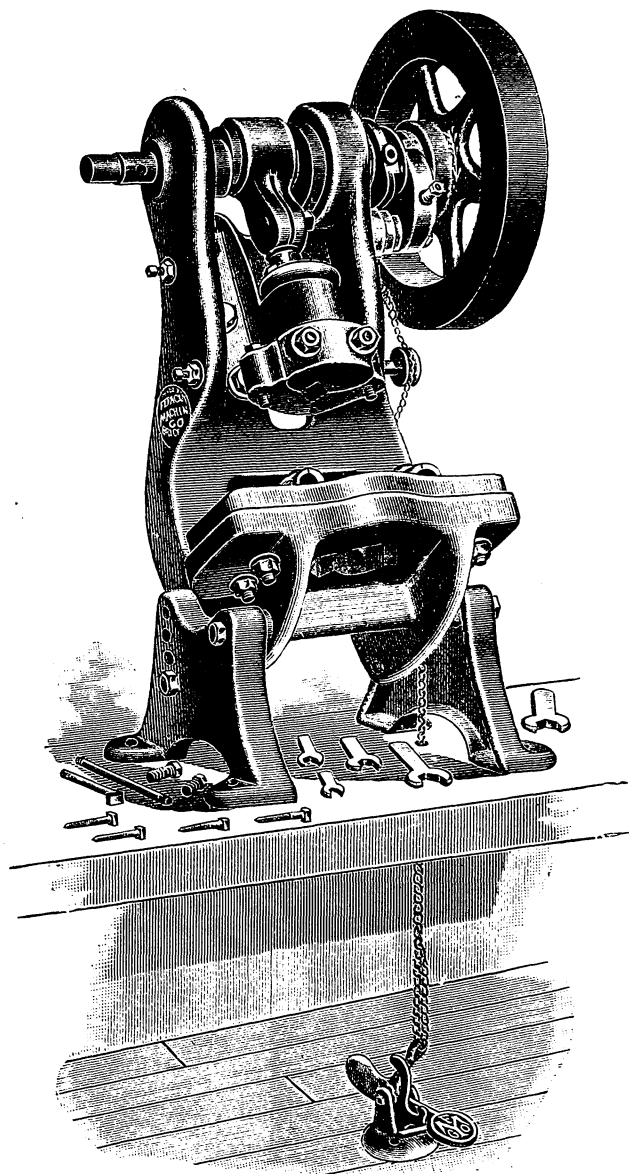
The Ferracute Inclinable Bench Press.

A new inclinable power bench press has been recently brought out by the Ferracute Machine Company of Bridgeton, N. J., from designs by Oberlin Smith. By the makers' new system of classification it comes under Class C, cutting presses, and Series 100, bench presses. Being of the first size, it is known as press C101. It weighs 875 pounds. A second size, of the same

x 3½ inches; weight of fly wheel, 230 pounds; revolutions of fly wheel per minute, 120; thickness of bolster, 2 inches; round hole in bolster, 4 inches; pressure safely exerted by ram, 12 tons. Extra bolsters with various sizes of holes are also furnished to order. Such presses as these are adapted for a great variety of cutting, forming, spring drawing, &c., in sheet metals of all kinds, together with leather, paper, cloth, &c. The frame is so mounted upon its legs as to be quickly inclinable to any desired angle by the elevating screw, together with proper clamping nuts for securing the same.

This press has an unusually heavy ram, arranged with very long and wide bearings; an extra long pitman adjustment, graduated to hundredths of an inch; proper arrangements for clamping various kinds of punches; a positive knockout when desired, &c. The bolster can be made to order with various sizes of central holes, and is provided with die-clamps, adjustable in T-slots upon the top face thereof.

The shaft is of forged steel, with unusually large and long journals. In an enlargement of its solid metal is mounted an automatic stop-clutch of the utmost simplicity, and which, withal, has its different members so interlocked with each other in the process of assembling as to require no nuts or screws whatever, these being objectionable in a device of this kind, where the tendency is to constantly knock them loose. This clutch is provided with a safety lock which, while performing other functions incidentally, can be so manipulated as to prevent the press from starting while dies are being set, &c. A new and valuable feature consists in a so-called "clutch plate," carrying the tripping device, which is adjustable around the shaft's axis, thus allowing the clutch to be tripped either earlier or later than the normal, to accommodate itself to varying degrees of momentum in the shaft and parts attached thereto, this momentum being dependent upon the conditions of speed, lubrication, extra weights upon shaft (as cams, gears, pulleys, &c.), and other circumstances which usually have to be controlled entirely by a brake, thus in many cases losing a large amount of power. In the hub of the fly wheel, besides four hardened wheel studs for driving, there are also mounted self-acting locking pins, which, while allowing the clutch slide in shaft ample time to enter spaces between wheel studs, finally lock the same after entering, and thus prevent the annoying back-lash incident to the use of spring-drawing dies and elastic work of various kinds.



INCLINABLE BENCH PRESS.

position, the card slipping through the slot in the spindle without injury. This device is made by Stephen Porter & Co. of 384 Atlantic avenue, Boston.

According to a European exchange, Castelin & Camion, Mezieres, France, have constructed an aluminum launch for the French expedition to Central Africa. It is composed of 30 pieces; it is made of plates 8 to 10 inches thick, is 33 feet long and 8 feet beam, and weighs complete with wooden fittings only 1780 pounds. The same firm are constructing a number of aluminum vehicles for use in Africa, and they propose to introduce them also into the French possessions in Asia.

design, known as press C102, weighs 1275 pounds. The picture shows the machine in wholly inclined position, from which it can be quickly changed by withdrawing and reinserting in other holes the two rear leg bolts. The treadle is provided with a lock by which it can be set to stop in the usual way each time the foot of the operator is raised, or so that it can remain down for continuous running. Its dimensions, &c., are as follows: Hole through bed 6 x 8 inches, rectangular, with an 8-inch round hole intersecting the same; hole through back, 11 inches; throat, from center of ram back to frame, 6 inches; height from bed to ram when up, 9½ inches; stroke of ram, 2 inches; adjustment of ram, 3 inches; fly wheel, 24

The Gordon disappearing carriage for the service 10-inch breech-loading steel rifle gun was tested for rapidity at the Sandy Hook proving ground on Wednesday, September 13. The result of the test was considered very satisfactory, as proving that rapidity of firing with a disappearing carriage for a gun of this class does not necessitate the use of power. The carriage was worked by hand throughout, and was independent of power appliances of any kind. The record was for ten rounds, which were fired in 59 minutes and 24 seconds, the last six rounds being fired continuously without any deduction of time for delays. Full service charges were used, the weight of powder being 259 pounds, and that of the projectile 575 pounds. The carriage worked remarkably well throughout the test.

WORLD'S FAIR NOTES.

The Norton Emery Wheel Company

of Worcester, Mass., show at Column E 53, Machinery Hall, what they claim is the largest and most complete assortment of emery wheels ever shown in an exhibit. It is estimated that there are 50,000 wheels in the exhibit, from $\frac{1}{8}$ inch to 36 inches in diameter, and $\frac{1}{32}$ inch to 6 inches thick, of every conceivable shape and for every purpose. They also make a fine display of grinding machinery in operation. The Worcester twist drill grinder is shown in three sizes. Their Walker universal cutter and tool grinder will grind all kinds of cutters and mills, reamers, twist drills, taps, lathe and planer tools, and in fact every tool known in the machinery business easily and practically. External and internal grinding and surface grinding on cup wheel can also be done. A novel feature is that each wheel furnished with this machine, of which there are 18, in all different shapes, is mounted on an iron collet, which is drawn into a taper protecting spindle that insures the wheels' run perfectly true, however often it is changed. There is absolutely no chance for emery to get to the spindle or any of the bearings. The machine is really universal without being complicated and difficult to operate. In connection with the grinder is a friction countershaft which has five changes of speed. A speed of 20,000 turns per minute can be obtained for small interval grinding. It is claimed for the new Norton elastic wheel that it is superior for saws, cuts free, wears well, and will not case harden. These wheels are in regular daily use in the sawmill exhibit. In the arrangement of the display a great deal of ingenuity is shown. Ornamental columns made of emery wheels laid flat on one another form posts for the pavilion. On a show board in the rear are fastened numerous specimens of unmounted wheels. Ornamentation has been secured in notable instances by putting together two or more wheels of different sizes. A cornice of this character runs across the top of the show board. The small wheels are shown in cases. M. B. Hill is in charge of the exhibit.

The Springfield Emery Wheel Company

of Bridgeport, Conn., occupy space at Column E 52, Machinery Hall. They make all kinds of Emery Wheels for all purposes, and their exhibit includes several pyramids of such wheels to indicate the character of their product. The feature of the display, however, is grinding machinery. They are builders of the heaviest grinding machinery in the world, and consequently make some notable exhibits in this line. An automatic knife-grinder for planing mills, grinds knives up to 144 inches in length. Water is used on the wheel to prevent the drawing of the temper from the knives. It requires no attendant after the knife is set and the machine set in motion. Another automatic knife-grinder has the base and bed in one casting, which makes it very rigid and free from vibration. There are two water tanks in the base of this machine. A centrifugal pump takes water from the lower tank and sends it through pipe connections directly on the knife where it is being ground. The water then runs down into the upper tank where the sediment settles, and the clear

water overflows to the lower tank. A large tool grinder is shown which also has a base and bed cast in one piece, with tanks located inside the base. A No. 3 surface grinder exhibited resembles in appearance a metal planer, the Emery Wheel being attached to the crosshead, which is raised and lowered by a belt from the countershaft. It is designed for grinding boiler fronts, but is adapted to grind any wide articles. The platen is propelled by a worm and worm gear connected to a large screw running through the center of the bed and connected to the platen by a long clamp nut, which gives a steady movement to the carriage, preventing vibrations that would impart a wavy look to the work. Two of these machines and two tool grinders were sold in the spring to the Chicago, Burlington & Quincy Railroad. A small floor grinder is shown, carrying two wheels up to 10 inches in diameter; another, somewhat larger, carries two wheels up to 20 inches or four thin wheels. A 60-inch automatic knife grinder is a heavy tool designed for grinding shear blades, veneer knives, planing-mill knives, &c. Three different styles of emery wheels are used on these machines to suit the different classes of work to be done by them. A special field of usefulness for these grinders is opening up in plate-rolling mills. When plates are cut to size or in special shapes the edges are squared or trued on these grinders, accurate and speedy work being done with a minimum of time and labor. Lack of space prevented a car-wheel grinder from being shown. This is a tool for grinding partly worn wheels into shape for continued use. It grinds wheels on or off the journal at the rate of ten pairs per day. The company have a Western agency at 125 South Clinton street, Chicago.

Northampton Emery Wheel Company

of Leeds, Mass., make an excellent exhibit of grinding machinery at D 53, Machinery Hall. They show a great variety of machines for edge and surface grinding, shaping, interior and exterior work, single wheels, double wheels, &c. With the exception of a very few these machines are shown belted up and ready for operation. Their Chicago office is at 20 South Canal street.

Diamond Machine Company

of Providence, R. I., exhibit grinding and polishing machinery at B 53, Machinery Hall. The machines shown comprise face and surface universal cutter and reamer, automatic knife, &c. A new surface grinder is among them, which is known as the Kinsey grinder. It has a double feed, both lateral and lengthwise, and finishes its work with a beautiful surface. The company also show speed lathes in several sizes. A peculiar feature of these lathes is the patent combined lever and screw feed in the tail stock. There are two spindles, the inner one being operated by the screw and the outer one by the lever, each capable of working without interference from the other. The lever, with its quick grip and equally quick release, is a great advantage in doing small work with a chuck. The company maintain a Western branch at 35 and 37 South Canal street, Chicago.

The Compress Wheel Company

of 149 and 151 Huron street, Chicago, make a good exhibit at A 53, Machinery Hall, of their special style of wheels for polishing and buffing. They are shown

with faces made of a variety of materials. A high column is erected, comprised of 32 wheels mounted on spindles, attached at right angles to a central support consisting of a stout wrought pipe. These wheels are shown in a variety of sizes.

C. E. Le Massena & Co.

of 776 Broad street, Newark, N. J., exhibit a showcase at B 50, Machinery Hall, containing many specimens of their solid leather polishing wheels, cones, paper wheels, &c. The leather wheels are made of disks of new oak tanned leather put together with elastic waterproof cement under heavy hydraulic pressure. They are turned to any shaped face, beveled, concave or convex. The material used resembles the finest walrus or sea-horse leather, but is much more economical. These wheels are in use for stove work, cutlery, plows, edge tools, saddlery hardware, nickel goods, jewelry, &c., and are made hard, medium or soft and medium, according to the service to which they are to be put. The paper wheels have emery or corundum applied to the face, are designed for roughing or hard cutting, and are much cheaper than solid emery wheels. Specimens are shown which have been in constant use over two years and are still in good condition.

Magnolia Anti-Friction Metal Company

of New York make an exhibit at Column E 53, Machinery Hall, of their metal for use in machinery bearings. A unique method is employed to show how special bearings are ordered. Blue prints and illustrated circulars covering these points are placed under large plates of glass on neat tables. They are thus easily inspected and attract much attention. In glass cases are shown many specimens of bearings which have been long in use. One of these is taken from Dolson, Chapin & Co.'s saw mill at Bay City, Mich. It has been in constant use three years, subjected to a speed of 210 revolutions per minute, worn but $\frac{1}{16}$ inch and looks good for many more years of service. A steamship bearing shown is taken from a shaft of one of the Oriental Steamship Company's vessels, where it was in steady use from 1887 until removed to be exhibited. Very little wear is perceptible. Interesting samples are shown of Magnolia bearings in good condition, compared with bearings of other metals run in competition with them. Much stress is placed upon the exclusive use of these bearings on the famous "City of Paris" and other vessels of the American line of steamships, as well as on many other vessels in the transatlantic service. This metal is also used exclusively on the fine passenger vessel "Manitow," recently built for the Lake Superior and Lake Michigan service by the Chicago Shipbuilding Company.

Columbus Bolt Works

of Columbus, Ohio, exhibit at A 52, Machinery Hall, a set of automatic machines for the manufacture of tire bolts. Four machines constitute the set, all being shown in operation. First is the header, which cuts the bolt from a coil of wire and heads it. Next is the pointer, next the shaver, and the last is the threader, finishing the bolt for use. The last three machines are particularly interesting. Each has a hopper into which the blanks are put, and each has a feeding device to pick up blanks and arrange them in a row for the subsequent operations of the machines. The

hoppers revolve with the blanks in them. Two slender steel prongs thrust themselves among the blanks which slide between the prongs and hang from them caught by the heads. The prongs then rise and the blanks slide down into the body of the machine. The work is done very rapidly and accurately. These machines are, however, merely an adjunct to the special design of the company's display, which is to call attention to their line of carriage hardware. They show samples of drop forgings of all descriptions entering into the manufacture of a carriage, embracing many very intricate shapes and peculiar patterns, difficult to make. The largest wagon and carriage makers of the country are among the customers of this company.

Otto Gas Engine Works,

Thirty-third and Walnut streets, Philadelphia, and 245 Lake street Chicago, make a large exhibit of their engines at H 31, Machinery Hall. Of these, one

not be obtained. One gallon of gasoline per horse-power will run an Otto gasoline engine ten hours. Otto gas and gasoline engines are also shown in the German department in Machinery Hall, and a 17 horse-power portable gasoline engine is exhibited in the Agricultural Building. There are now 40,000 Otto engines in use, having an aggregate of 250,000 horse power.

The Garvin Profiling and Die-Slotting Machines.

The single spindle profiling machine, shown in Fig. 1, is adapted to a much wider range of work than the regular single and double spindle profilers made by the Garvin Machine Company of Laight and Canal streets, New York. The uprights carrying the cross slide are higher, giving a greater distance between the cross slide and table. The sliding table is larger, has three T-slots its full length, and a circular table has

The die slotting machine shown in Fig. 2 is well adapted to all die work, small key seating, both straight or taper, making internal gears; also internal or external gear patterns, where draft is required, and all that class of slotting common to a light machine.

The two cross motions and the rotary table provide for following any outline, and the arrangement of the handles is convenient and avoids mistaking one for the other.

The handle for the rotary table is arranged for using dials for dividing purposes, and for small divisions and rapid work it may be entirely removed, and the table revolved by hand, using the lock-pin device which provides 12 divisions for square, hexagon, octagon, 12 side, &c.

The handle for operating the elevating screw is conveniently placed at the right of the knee.

The stroke of the machine has been fixed at 2½ inches, which is ample for the class of work for which the machine is intended, and affords greater strength than an adjustable pin.

The work is brought into proper relation to the stroke by raising the knee, and as the cutting is done at the slowest part of the stroke, for thin work, the number of strokes can be increased by means of the cone pulley.

The slide for the ram can be swiveled 5 degrees either way and set by a graduated index, thereby insuring the same draft to every part of the die. The tool block is well adapted for holding special tools. It swivels on a center near its lower end, and at the upper end, carried in a yoke, are two hardened plugs which bear on a cam that is bushed into the lower end of the connecting rod and from it derives a partially rotary motion, thus locking the tool block on the down stroke and causing the tool to clear on the up stroke.

The general dimensions are:

| | Inches. |
|--|----------|
| Diameter of circular table..... | 12¾ |
| Vertical adjustment of table..... | 15 |
| Adjustment in line with spindle..... | 8½ |
| Adjustment across line of spindle..... | 7 |
| Largest diameter of cone..... | 10 |
| Proportion of back gearing..... | 5 to 1 |
| Front spindle bearing..... | 1¾ |
| Size of tool used in the tool post..... | 1 x 1½ |
| From face of column to center of tool..... | 9¼ |
| Weight complete..... | 900 lbs. |

The Witwatersrandt gold fields in Africa are increasing rapidly in production. In 1888 the output was 230,640 ounces. Since then there has been a steady growth, with the following record: 1889, 382,364 ounces; 1890, 494,756 ounces; 1891, 728,613 ounces; and 1892, 1,210,862 ounces. For the first eight months of 1893 the product was 927,209 ounces, the output of June, July and August having been 385,145 ounces, so that the district is now turning out gold at the rate of over \$30,000,000 per year.

It has been proved that iron T-girders were used by the Romans in construction before the Christian era. Some tons of broken T-girders of that metal were found a few years ago during the excavation of the great *cella soliaris* of the baths of Caracalla in Rome. These girders had been cased in bronze, and they were arranged so as to form square panels, which were filled in with concrete, decorated with mosaic and delicate stucco reliefs, colored and gilt, thus forming a strong and richly decorated flat ceiling, with a span of great width.

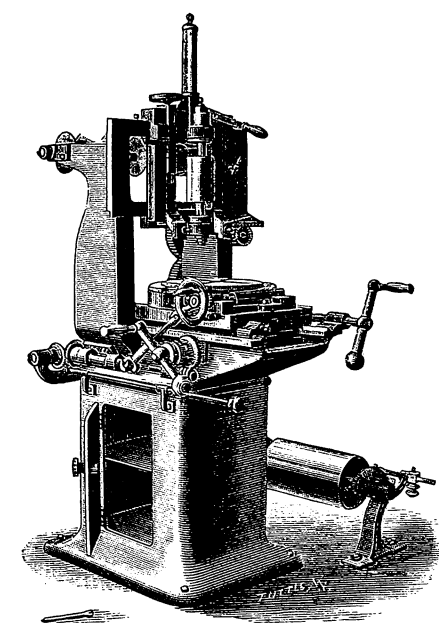


Fig. 1.

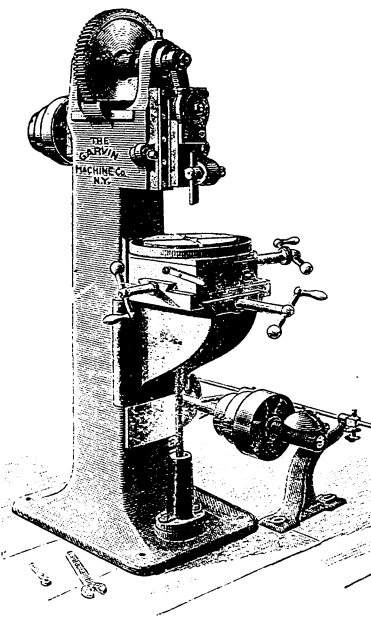


Fig. 2.

THE GARVIN PROFILING AND DIE-SLOTING MACHINES.

100 horse-power, one 50, one 16, two 7 and one 1 horse are shown in operation. In addition, the exhibit comprises one 15, one 2 and one ½ horse-power gas engines, and one 17 horse-power gasoline engine. These engines may be run with an electric spark or a tube igniter, as preferred. In this exhibit both methods are shown. The tube igniter has patent controlled valves which regulate the time of ignition, prevent premature firing, and thus avoid starting backward. The electric igniter is also a patent device, and is not, as formerly, a perishable part of the machine. By an automatic arrangement the batteries are cut out every time the engine is stopped, and thus protected against running out while the engine is standing. The 50 horse-power engine is shown with a self-starter, which is a hand pump by which a mixture of air and gas is forced into a receiver, whence it passes into the cylinder and starts the engine without the application of hand power to the fly wheel. This was tested in the presence of the writer and required but three-fourths of a minute to get up full speed. The gasoline engines are adapted for use in localities where gas is very dear or can-

been added, having T-slots crossing at right angles and arranged to revolve by hand or power and trip automatically at any point as the work may require. In addition to the usual balanced handles for moving the sliding table, it is also provided with power feed, which is thrown in or out by means of a clutch, and the feed of either the sliding or revolving table may be reversed instantly by moving a shipper rod in easy reach of the operator. The spindle slide is balanced and provided with graduated adjusting screw and stops, giving a quick and accurate adjustment to any height. The spindle is driven by one belt, passing from the countershaft under sliding idle pulleys. Ample means of adjustment for wear are provided in all gears and racks, and stops are provided for the sliding table and cross slide. The principal dimensions are: Sliding table, 15½ by 24 inches; diameter circular table, 14½ inches; from sliding table to cross slide, 10½ inches; from circular table to cross slide, 7½ inches; movement of cross slide, 11 inches; diameter of circle that can be milled by power, 13 inches; diameter of circle that can be milled by hand, 28 inches.

Anhydrous Ammonia Gas as a Motive Power.*

BY T WALN MORGAN DRAPER, NEW YORK.

The author first states that "many bright people are endeavoring to discover a force which shall fulfill the con-

The initial temperature of steam at 150 pounds pressure is 446° F. Anhydrous ammonia gas at the same pressure has a temperature of 80°.

The relative proportions of the two are:

| | Water. | Ammonia. |
|----------------------|--------|-----------|
| Latent heat..... | 990 | 752 |
| Relative volume..... | 1728 | 0.1313.28 |
| Boiling point..... | 212° F | -38.5° F |
| Ratio..... | 100 | 0.76 |

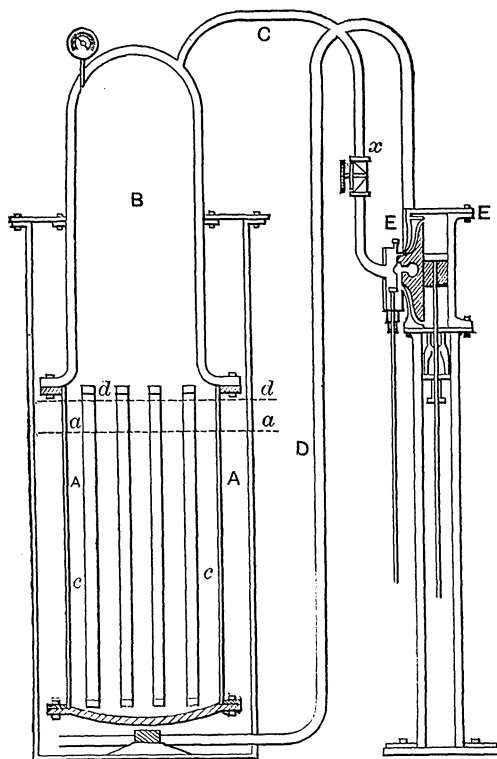


Fig. 1.—Dr. Lamm's Ammonia Engine.

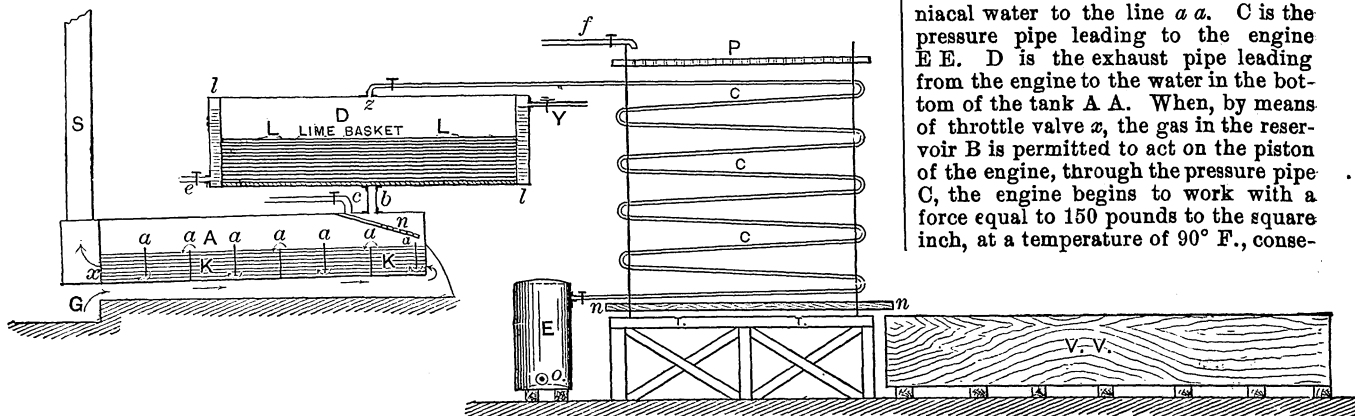


Fig. 2.—Plant for Manufacturing Anhydrous Ammonia.

ANHYDROUS AMMONIA GAS AS A MOTIVE POWER.

ditions of tractability, safety and economy, as yet without success," and he believes that these conditions have been more nearly fulfilled in some experiments conducted by him upon ammonia as a motor fluid than in any other process heretofore proposed for its use. The first portion of the paper is devoted to a discussion of the properties of ammonia gas, and the combinations of ammonia with water.

* Abstract of paper presented at the World's Engineering Congress, Chicago, July, 1893. American Society of Mechanical Engineers.

The temperature and pressure exerted by ammonia gas are founded on the relative points as ascertained in practice; that at a temperature of 60° F. there is exerted a pressure of 110 pounds, and at 80° F. a pressure of 10 atmospheres, or 147 pounds, the proportion being 20 : 37 :: 1° : 2°.

If smaller or greater pressures are required than those given in the table, it becomes simply a question of lowering or raising the temperature.

Anhydrous ammonia, or dry ammonia gas, condenses to a liquid at -38½° F., or it can be condensed by a pressure

varying from 150 to 185 pounds at a temperature of +70° F. On the removal of this pressure the gas expands fully. This is not entirely availed of in the ammonia motor, as during its expansion it is used like steam to drive the piston of an engine. The gas is as easily handled as steam, quite as safe, far cheaper, and in many respects resembles steam.

It is the remarkable affinity of ammoniacal gas for water, by which it is able, at any time after its condensation into a liquid, to reproduce, at a distance from where it was condensed, a force equal to the heat which was necessary for its condensation, which makes the ammonia gas engine a possibility.

The most important of the older ammonia engines was that of Dr. Emile Lamm; later ones, in their principles, following his closely. In 1870, in describing his engine, he said: "This reproduction is owing to the fact that the latent heat of the gas appears anew in water of reabsorption, and is retransferred to the liquefied gas. This takes place through metallic tubes of which the reservoir is composed, from the water of reabsorption which surrounds them, and is similar in its operation to the action of fire in the furnace of a steam boiler."

Lately we have vastly increased the number and dimensions of these tubes over those thought sufficient by Dr. Lamm, because, although we find that a small evaporation surface would demonstrate the utility, yet for practical purposes a large evaporating or heating surface was necessary. At a single step I increased this surface for 1 horsepower from 5 to 30 square feet, and find it economical in many ways.

By reference to Fig 1, which is Dr. Lamm's engine, the arrangement just spoken of will be easily understood. cc is the ammonia reservoir filled with the anhydrous liquid to the line dd. AA is the tank filled with weak ammoniacal water to the line aa. C is the pressure pipe leading to the engine EE. D is the exhaust pipe leading from the engine to the water in the bottom of the tank AA. When, by means of throttle valve x, the gas in the reservoir B is permitted to act on the piston of the engine, through the pressure pipe C, the engine begins to work with a force equal to 150 pounds to the square inch, at a temperature of 90° F., conse-

quently the whole apparatus must remain at a temperature of 90° F. to give an effective pressure of 10 atmospheres for any given time that may be desired.

One of Dr. Lamm's engines, propelling a street car on a 7-mile run, was equal to 2 horse-power; the liquid ammonia expended was 1.16 cubic feet. Therefore, the latent heat of ammonia gas (according to Dr. Lamm) being 880, the whole heat expended during the trip made was sufficient to raise 84 gallons of water from a temperature of 83° to the boiling point, 212°.

I will now proceed to discuss and describe the

Ammonia Manufacturing

plant and the ammonia engines as they are now, in the light of the latest improvements.

in order that it may, by means of the heat, become thoroughly deammoniaized. This latter operation begins immediately when the solution commences to fall on the tubes through the scattering plate, and it is so thoroughly effected that by the time it reaches

The gas is accompanied by aqueous vapor, and the object of the dehydrator is to free it from this. The dehydrator is a long cylinder, having at either end a water compartment, *ll*, connected with a series of tubes. On the bottom of the cylinder is an angle-shaped per-

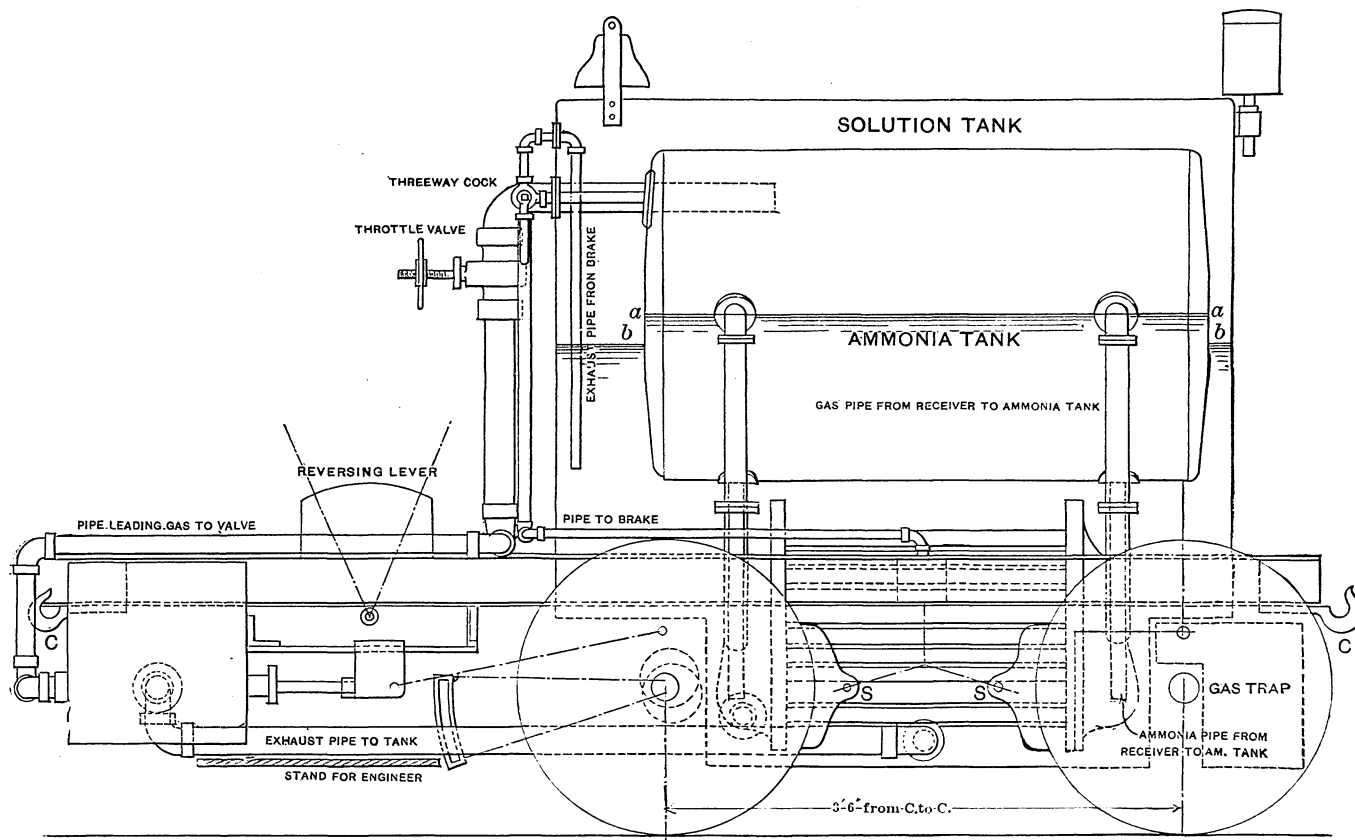


Fig. 3 A.—Side Elevation Ammonia Locomotive.

The chief difficulty with all plants for the manufacture of anhydrous ammonia liquid has heretofore been that the gas which it has been sought to condense contained more or less aqueous vapor, which, remaining with and being condensed with the gas, resulted in a liquid not absolutely pure, and robbed it of its power to some extent.

In Fig. 2 is shown a design, an improvement on one actually in operation, which meets this difficulty in a most satisfactory way. I will say in advance of describing the plant that it is absolutely necessary that all parts of such a plant shall be so constructed as to withstand in all its parts a pressure of at least 200 pounds to the square inch.

A is a solution boiler, or still, similar in construction to an ordinary tubular boiler, so set that the end next the stack *s* is slightly lower than the other. The grate is at *G*, and the heat passes first beneath the boiler, thence back through the tubes and out at the stack. No great heat is required, 122° F. sufficing. The ordinary commercial ammonia is introduced at *c*, and falls on the scattering plate *p*, and from thence on the tubes *k k*. You will observe a number of upright partitions, *a a a*, and you will also notice that the first one is raised just above the bottom of the boiler, the next one being all the way down, the next above, and so on. These partitions are merely thin sheets of boiler iron, through which the tubes pass, their object being, in connection with the sloping setting of the boiler, to force the ammonia solution to follow the course indicated by the arrows,

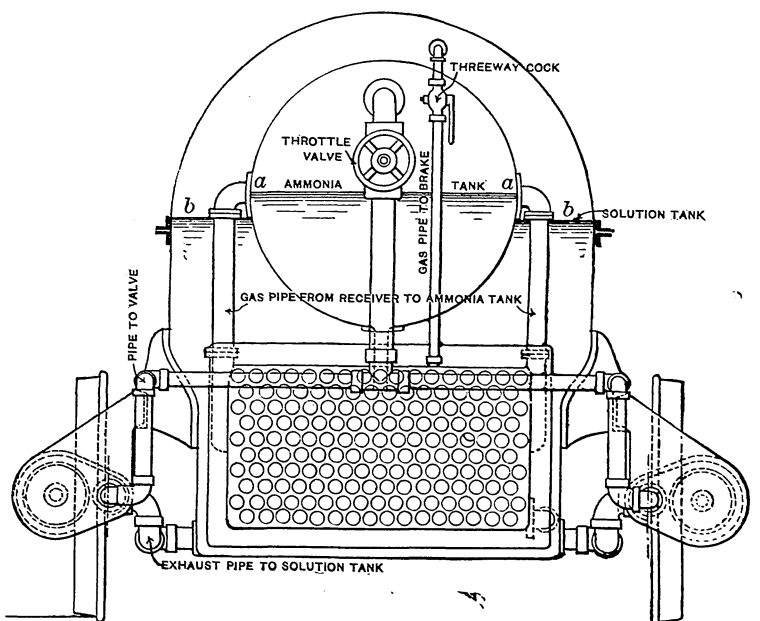


Fig. 3 B.—Cross Section Ammonia Locomotive.

ANHYDROUS AMMONIA GAS AS A MOTIVE POWER.

the blow-off point at *x* it contains usually not over 5 per cent. ammonia. The gas, as it evaporates, rises from the boiler, through the scattering plate and the in-pouring solution, to and through *b*, into what is called a dehydrator, D.

forated plate; the gas rising from the boiler meets this perforated plate, which scatters it all along and around the tubes, through which cool water, let in at *Y* and passing off at *E*, is constantly flowing. Just above the tubes is a wire basket, *Z Z*, filled

with lime, the pieces being about the size of peas; the partially dehydrated gas, from contact with the cool tubes, now passes through the bed of lime, which is about 2 inches thick, and is there freed of its watery vapors and becomes fully dry. By this means one obtains in the upper or storage part of

The condensation is accomplished by means of very cold water falling from the scattering table P over the coils. In order that this water may not be wasted it is caught in a tray, *nn*, below and conducted to a series of wooden vats, *V V*, where it is allowed to cool, and is used over and over again; it can also be

total weight, with charge, of the motor should not exceed 3 tons, and at the same time should have a traction force of 1000 pounds; total height above rail, 10 feet; speed, not less than 6 miles per hour, and this speed to be attained in six seconds. Further, the shifter must be able to run a reasonable length

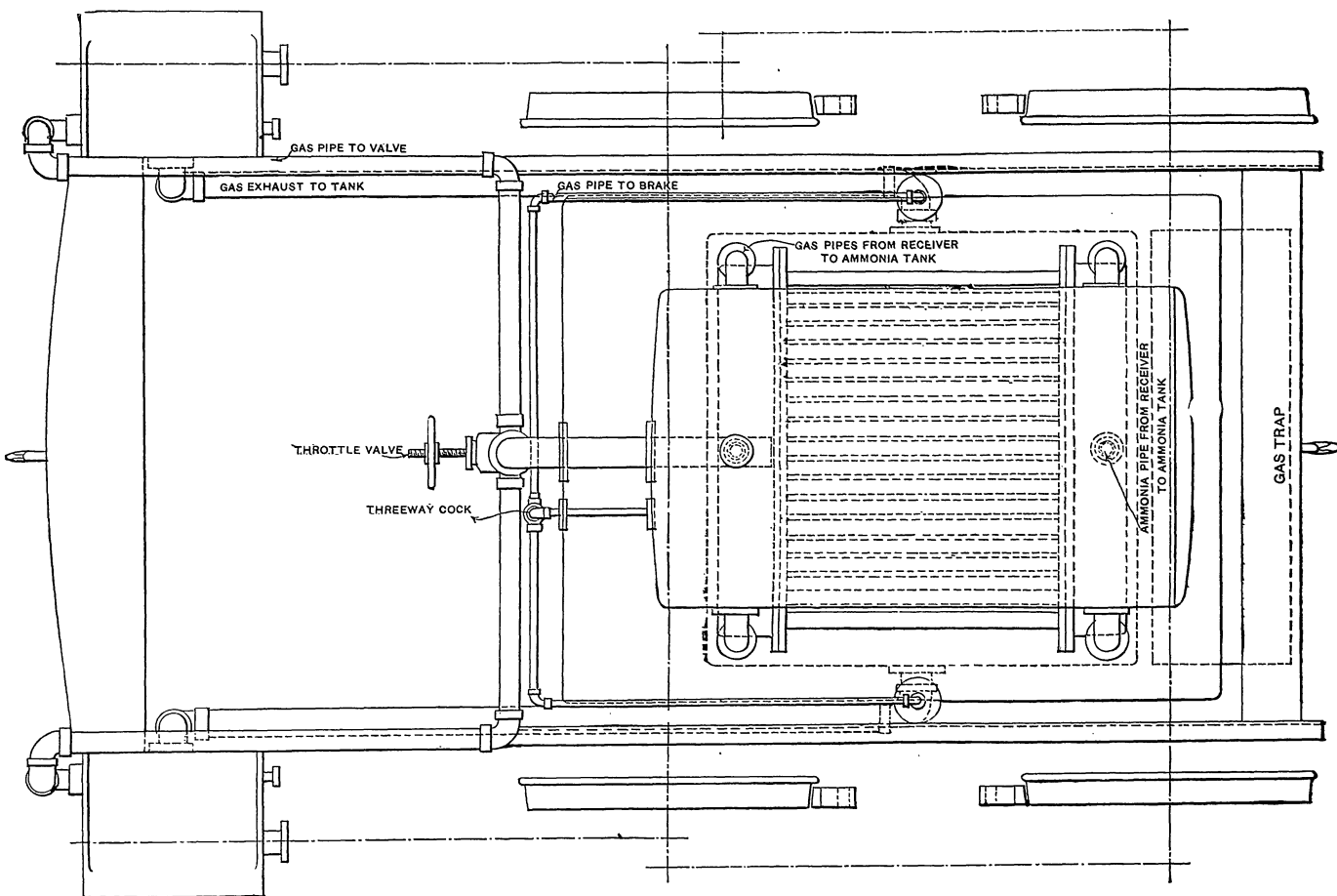


Fig. 3 C.—Plan View Ammonia Locomotive.

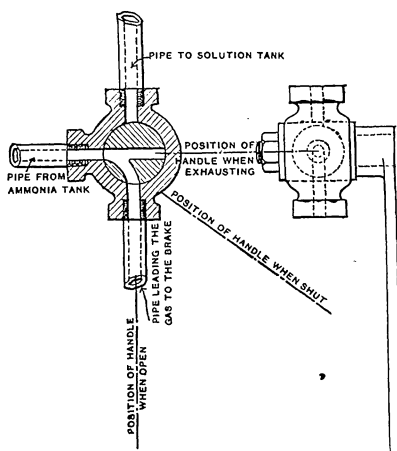


Fig. 3 D.—Brake Valve Ammonia Locomotive.

artificially cooled in the same manner as is done in the cold storage plants.

The illustrations shown as Fig. 3 are of an

Ammonia Locomotive

recently designed for transfer purposes, intended to be used on a cable road for shifting the cars on and off of the cable, into or out of the car shed. The house

of time without recharging. The annexed drawings illustrate the design made to fill these specifications. I have made some slight changes from the original designs, notably in placing the gas trap forward of the front axle instead of just behind the rear axle, and have obtained thereby a more perfect distribution of weight. I have also largely increased the amount of evap-

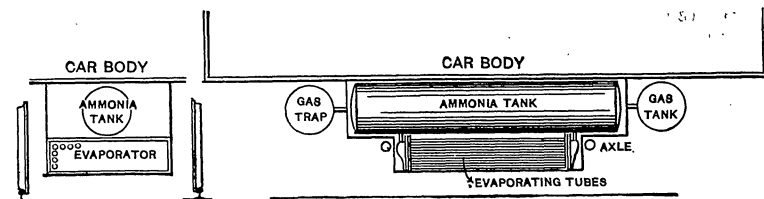


Fig. 4.—Motor Beneath Platform of Street Car.

ANHYDROUS AMMONIA GAS AS A MOTIVE POWER.

the dehydrator a perfectly dry gas, which, passing out of the top at Z, flows to the coils *ccc*, where it is condensed and falls by means of gravity and the pressure from the still (150 pounds) behind it into the storage tank E. There are ten rows of condensing coils, only one of which is shown in the figure; each row has a total length of 100 feet.

space of the company being limited, their engineers arranged an electric traveling table, and on this a turn table; the latter was, of course, quite limited in length, only long enough to allow of a 36-foot car and a motor 10 feet over all. In addition to this, the company's engineer imposed, on account of balance of the table, that the

orating surface, by doubling the number of tubes, adding thereby to the quickness of evaporation and the pressure. Its power is vastly increased, as is its speed, by these changes, without overstepping the limits of weight, &c., imposed.

The locomotive shifter is direct acting. I have endeavored in the draw-

ings to make everything so plain that description would be largely avoided. The inner or anhydrous ammonia liquid tank, of $\frac{1}{4}$ -inch boiler iron, is to contain the charge, in this case calculated amply for a 14-mile run. This charge fills the tank half full, the upper half serving as a gas reservoir. Below this tank is hung the evaporator, manifolded at either end. The evaporator and the ammonia tank are inclosed in one large outer or solution tank, which is partially filled with water or the blow-off solution from the still (containing about 5 per cent. ammonia) to the line *bb*. The engine cylinders are placed on the frame at the rear end of the locomotive. The outer tank is made in three sections (no great pressure is possible in it) on account of cheapness of construction, and it also allows of the raising off of the upper rounded section, or the intermediate, to examine or repair the inner tank, evaporator or piping. The frame consists of two 4-inch channel irons (20 pounds per yard) 9 feet long, which support the outer tank by means of cast-iron suspenders bolted to the frame; the jaws for the axle journal and the cylinders are also bolted to the frame. It is supported by equalizers connected by means of springs. The frame is 20 inches above the rail, with its full load.

The machinery consists of two 6 x 9 inch cylinders, with piston valves, surrounded by cast-iron jackets, the initial power behind the piston being 4240 pounds. The piston works on a cross head, which is connected with the connecting rod to the driving wheel, and thence by means of a link rod to the front wheel. The piston valves are inside, and their rods are connected by means of rock shafts and levers with the reversing link, which latter is also inside. The brakes, worked by gas also, led through a three-way cock or brake valve to a 3-inch cylinder, the piston of which works on the brake arms, and these on the shoes. When the gas is on, and it is desired to cut off the brakes, the gas returns through the valve to the solution tank, where it is at once absorbed. The brake shoes are hung in such a manner that they loosen when the gas is cut off. The gas trap is hung in front of the forward axle, is of $\frac{1}{4}$ -inch boiler iron, air and water tight.

The manner of operating the locomotive is as follows: The inner tank receives its charge, and the outer tank at the same time is filled with the 5-7 per cent. blow-off solution from the still, this solution being charged usually at a temperature of 80° F., though a little more or less temperature does not matter. If above 80 it will give increased pressure; if below, it will increase its heat in running by the discharge from the cylinders. The motor is now ready to run; when its charges are exhausted it returns to the station and they are renewed. The quantity of absorbing fluid in proportion to the anhydrous liquid charge is about 5 to 1. When the liquid has been exhausted, it has been in the form of exhaust gas absorbed into the solution in the outer tank, which latter has practically become commercial ammonia, which, being withdrawn at the station, is redistilled and used over and over again, a new charge taking its place in the motor, as well as a new change of anhydrous liquid. Thus the process repeats itself almost indefinitely, the annual loss being not over 10 per cent.; from commercial ammonia to anhydrous ammonia gas, to anhydrous liquid, to gas, in this form used as a

motive power, discharged then into water, which it converts into commercial ammonia. There is no reason why pure water should not be used, instead of the weak solution of ammonia from the blow-off, for absorbing; this is, in fact, done, but the objects in using the blow-off solution from the still are obvious; 1, the small percentage of ammonia therein is saved; and, 2, the temperature necessary for charging for proper operation could not be more economically or easily obtained.

The economy of such a motor is easily understood: practically no loss of material, small amount of fuel consumed in the manufacture, the absence of a stoker on the motor, it requiring but one man to run it.

The exact cost of manufacturing anhydrous ammonia liquid has not yet been ascertained, nor the cost of operating; this will only come with time and experiment, but sufficient is known to state positively that the cost is not over one-fourth that of steam or any other motive force.

To revert again to the locomotive, the liquid force is as follows: It passes down from the inner tank into the evaporating tubes, and these, surrounded by the 80° F. solution, cause it to rapidly evaporate at a pressure of 147 pounds to the square inch. It rises from the manifolds at the ends of the tubes to the upper half of the inner tank, from whence it flows to operate the engines. The gas exhausted from the engine cylinders passes in at the bottom of the outer tank, at a point between the axles, and is instantly absorbed. A small pipe, leading from the gas reservoir, passes through the three-way cock to the brake cylinder, and by simple means is returned into the solution of the outer tank.

The engine cylinders are surrounded by jackets, through which absorbing solution flows, for a twofold reason—namely, to keep up an equitable expansion temperature, and to absorb any gas leakage that should occur.

The object attained by the gas trap, which is about half full of water, which it is seldom necessary to renew, is to absorb through a check valve, by which it is connected with the outer tank, any gas not absorbed therein, avoiding thereby any possible back pressure, smell or leakage.

The discharge of the exhaust gas into the solution of the outer tank keeps the temperature of this solution almost constantly at 80° F., for reasons already given, the exception being that this discharge usually raises the temperature, the proof of which I have found to be that a motor returning from a trip usually does so with its gauge showing a higher pressure than that with which it started out. Against this I find that if from any cause an ammonia motor is allowed to stand, say on a siding all night, the temperature of the absorbing solution will fall materially. A simple means of raising its temperature, and the pressure as well, is to allow a small jet of ammonia gas from the reservoir to flow into the absorbing solution, which quickly heats it.

Fig. 4 represents a recent plan of mine for placing the motor and machinery beneath the platform of an ordinary street car. Similar, but very cumbersome, apparatus has already been placed in this way, and it had various inconveniences which this arrangement obviates. This motor, which could be attached to any car without altering its body, has the following characteristics:

Capacity of solution tank.....600 gallons
Capacity of ammonia tank.....90 gallons

Heating surface of tubes....200 square feet
Capacity of gas tank.....40 gallons
Capacity of gas trap.....40 gallons
Center to center of axle.....6 feet
Solution tank is 8 feet by 2 feet 6 inches by 3 feet 6 inches.
Ammonia tank is 7 feet 6 inches by 17 inches
Diameter of wheels, 30 inches.
Bottom of tank above the rail, 6 inches.
Car body, 16 feet without platforms.

The cost of such a motor placed beneath ordinary street cars would be in the neighborhood of \$600.

San Francisco News.

A concerted effort is now being made by our manufacturers to have consumers in this State use California manufactured goods in preference to those imported from the East, and the Manufacturers' and Employers' Association of this city have now bent their shoulders to the work in real earnest. They say, in an address specially prepared for circulation among the consumers of this State, that a senseless prejudice exists among many retailers against the sale of goods manufactured in California. This complaint, they say, comes from manufacturers in every line from tobacco to iron, and they adjure all purchasers to not only ask for California goods, but to assail those who prefer goods manufactured in the East from all sides with facts and with arguments until they can no longer be ignorant of their own true interests. The vice-president of this association, which was formed soon after the inauguration of the great strike of molders, is Oscar Lewis, a prominent man in the iron industry in this city and one of the leading members of the association. This association helped the iron founders largely to triumph in the contest, wherein the struggle for victory involved so many sacrifices that it was almost as disastrous as defeat. Eight of our iron founders are now members of the association. The iron industries of the State and coast have been, perhaps, more injuriously affected by the competition of the East than all others together. A dozen years ago the founders in San Francisco melted an average of almost 16,000 tons of pig iron every year. Last year it was a little over 12,000 tons. This year it will not exceed 10,000 tons. But meanwhile there has been added to the population of the State one-third more people, and in fact on this basis we should have last year netted 20,000 tons of pig iron. Now, to use the words of a leading gentleman in the importation line, the stock is small, smaller than ever before, but there does not seem to be any demand, and American pig can be had at \$18 per ton. The total importation of Eastern manufacturers of iron and steel by rail and sea does not fall short of 90,000 tons a year. This is worth at a very low estimate fully \$5,000,000. The iron work for some of our leading buildings has been the product of Eastern works. Such has been the case in the Chronicle Building of this city and several others put up during the past few years. The girders for the new City Hall to the amount of \$50,000 were made by the Carnegie firm, and so, in other cases, the demand for Eastern goods, the product of Eastern foundries, has been more marked during the past few years, and has become more so because the foundrymen have been hampered by the demands of the labor unions. This led to the great strike, as the employers found that they had to throw off the yoke or go out of business.

But the long struggle itself involved loss of more business still, and now it is not so easy to recover the lost ground. Of course the figures I have given relate principally to San Francisco and its immediate neighborhood, but they could be doubled if we include the whole of California and other States and Territories of the coast, so that our iron men, as far as their part of the struggle is concerned, have started in to fight for a very great stake indeed. And they will have abundant capital at their back.

There has been a slight improvement in trade during the past two weeks, although if we were to accept the verdict of the Clearing House exchanges the present volume of business in San Francisco would seem to be reduced about one-third when compared with that of a year since. A great deal of the reduction must, however, be ascribed to the almost total cessation of business in mining and other securities. There have been large sales of produce at low prices, and the money thus received by agriculturists must be diverted into the channels of trade ere long. There is much more activity observable in our leading houses than there has been in a good time.

THE WEEK.

The much vexed question of the location of the new United States mint in Philadelphia is at last set at rest by the decision of Secretary Carlisle on a site at Broad and Cherry streets in that city.

The New York and New Jersey Bridge bill was favorably reported to the House of Representatives last week from the Committee on Commerce.

The competition of the new electric street railways in Brooklyn is being keenly felt by the elevated roads of that city. The decrease in recent traffic has necessitated a cut of 10 per cent. in the wages of all "L" road employees from October 1.

Insurance companies report an abnormal number of losses from the West during the past few weeks. One large agency, having a choice of Western business, finds Western losses exceed 60 per cent. of all.

The City of New Orleans has just sold for \$700,000 cash down, to the New Orleans City & Lake Railroad Company a renewal from 1906 until 1956 of that company's extensive street railway franchises.

Great surprise is expressed in the naval service at the report that the boilers of the cruiser Chicago, now absent on the European station, are in so bad a condition as to require her immediate return for repairs. This vessel has been only seven years afloat, during which time her machinery has not been subjected to any hard usage, therefore it is thought that the defects must be due either to inherent weakness or careless use, either of which reason would demand strict investigation in the interest of the efficiency of the naval service.

The new battle ship "Indiana," which has been put into dry-dock at the League Island Navy Yard, Philadelphia, to receive her propellers, will, it is announced, be ready for her preliminary trial trip by the middle of October. The Government test of the triple-screw cruiser "Columbia," also

built by the Cramps, will be made about November 1, when it is expected that she will exceed the speed attained on her preliminary trial.

Nearly 4,000,000 rupees are to be expended in India immediately on new railroads, and it is intended to link all the lines so as to form, as far as they go, a complete network of railways. Indian railways are under the control of the Imperial Government.

Quite a large number of orders for vessels were placed with the Clyde shipbuilding firms during the month of August, causing an appreciable improvement in the condition of that industry and allied trades in Scotland, after a prolonged spell of dullness.

Domestic coastwise trade, as recorded in the report of the New York Custom House for the year ended August 31, appears to be very satisfactorily growing in value. During the year under review the coastwise tonnage of the port of New York was 555,449 and the foreign tonnage was 1,011,176, valued at \$109,145,615 and \$107,120,344 respectively. In 1892 the tonnage of the coastwise trade of the port was 525,295 and the foreign 1,032,036, showing an increase in the former of 30,154 tons and a decrease in the latter of 120,860 tons.

Louisiana's rice crop will fall this year far below the average. A late estimate places it at less than 750,000 sacks, as against 2,000,000 sacks in 1892. The shrinkage is attributed to drouth. The farmers of the State talk of irrigation next year.

After several years' experiments the Lighthouse Board has been successful in establishing electric communication with lightships and lighthouses placed at a distance of more than a mile from the shore. The difficulties which have hitherto prevented connecting by electric cable a vessel swinging at anchor at sea with the land are said to have been overcome by attaching the core of the cable to the anchor chain and making a conductor of the latter. The leakage of electricity produced by the water has also been reduced to a minimum. Telephonic communication has been established with some off-shore light vessels, and it is intended that all shall be similarly connected with the shore. This will prove the means of a great saving to the shipping interests of this country, as life-saving stations will be quickly and easily communicated with in cases of emergency.

The President of the Argentine Republic has presented to his Congress a very favorable report and forecast of the financial condition of that State. So satisfactory are the finances that it is proposed to largely reduce the duty on tobacco imported from the United States, this source of revenue having been more than counterbalanced in the increased exports of Argentine wheat to Europe. The production of wheat has been very great this year, and during the first six months of 1898 the United States and the Argentine Republic were the largest contributors to the wheat supply of England. Late cable advices from Buenos Ayres speak of serious revolutionary troubles in the Argentine, which may, however, upset all calculations, financial and otherwise, for the coming year.

Great activity is reported from the United States torpedo station at Newport, R. I., where a large number of important experiments are under way, including tests of a number of torpedo

defense nets, the Ericsson submarine gun and the Cunningham and Edison-Sims torpedoes.

The building of oil-tank steamers has become an important branch of naval construction. There are at present 47 of these vessels afloat, varying in size from 666 to 4134 tons gross, while 17 more are building at European yards.

The price of raw sealskins has advanced 25 per cent. since the Behring Sea decision.

The German Imperial Government proposes instituting a state control of shipbuilding, a duty which has hitherto been performed by private associations. The competition among these associations tends, it is argued, to a lower standard of shipbuilding, a danger which might be avoided by Government supervision.

As the result of comparative trials of the Baker and the Holland submarine boats the Board of Naval Experts has forwarded a report to the Navy Department setting forth its recommendations in favor of the Holland boat. The report recommends that the Holland company be instructed to have their proposed boat built at some responsible shipyard, and that they be awarded the contract at their price of \$135,000. Of the \$200,000 appropriated by Congress \$150,000 was intended for the boat and \$50,000 for experiment. The Holland boat, it is expected, will be able to descend to a depth of about 60 feet and make about 10 knots under water.

A tariff conference between Russia and Germany is to be held in Berlin next month, with a fair prospect of settlement of the present tariff war between these countries. It is said that Germany is ready to concede lower rates on Russian cereals in return for a reduction of the Russian duty on manufactures of iron and some other goods. Immense quantities of grain are piled up at Russian ports awaiting shipment.

The un-American proceeding of "persuasion by dynamite" was used by union sailors at San Francisco on Sunday against non-union men, of whom five were killed and a number injured by the explosion of a bomb thrown into their boarding house.

A bitter contest has been going on since August 3 between the elevator companies and the farmers in Minnesota, in consequence of the companies having applied for a permanent injunction on the erection of the State farmers elevator at Duluth, for which the Minnesota legislature have appropriated \$120,000. On September 23, however, the application of the elevator companies was refused, and the farmers will now proceed to erect their own elevator.

White Caps in Eastern Mississippi and Western Alabama have posted notices on the doors of every cotton-ginning house in these districts that if a bale of cotton is ginned before the price shall have reached 10 cents the property of the ginner will be destroyed by fire.

The representatives of French workmen sent to study the World's Fair reached Chicago in two divisions. One arrived on the 18th and the other on the 22d inst. They received a cordial welcome from prominent leaders of the Chicago trades unions, who are doing all they can to make the visit of their transatlantic friends pleasant. They are expected to sail from New York for France on the 30th.

The Iron Age

New York, Thursday, September 28, 1893.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - BUSINESS MANAGER.

The Loss of Profits to Manufacturers.

One important phase of the recent developments in the iron and steel trade of this country has not received that attention which it deserves, and that is the disappearance of profits to all engaged in the industry from the moment the raw materials are taken from the ground until the finished article is placed in the hands of the consumer. Unfortunately, numerical expression cannot be given to this fact, because so very few of our corporations in the iron trade are public companies whose reports are accessible.

Business men are so accustomed to hear manufacturers cry before they are hurt that complaints now, if they were made, would often be skeptically received. Of course the decline in prices does not measure past profits. If it did it would be a waste of sympathy to deplore the present condition of iron ore miners, coke makers, vesselmen and manufacturers. The carriers have contributed to a moderate extent to the decline of values. Labor has been reduced all along the line, and has thus aided in making low prices possible. But undoubtedly the most heroic cuts have fallen upon the capital invested in plant and property.

No one pretends that the iron mining companies of Lake Superior are earning dividends. The lake fleet of vessels has been forced to take rates of freight which may possibly cover cost. The coke producers, with Connellsville selling at \$1.20, cannot possibly be earning decent interest on the enormous idle plant through the operation of the few ovens running, even though that figure might enable them to do very well when in full operation. The furnacemen, in spite of cheap materials, are selling at prices which do not leave any margin, and steel works who sell soft steel billets at \$18.50 are not getting a new dollar for an old one, not to speak of renewal and improvement accounts.

The loss of profits, the lowering of wages and the decline in freights on raw material are cumulative as the higher forms of product are reached. A drop of \$1 per ton on ore means more than \$1.50 on pig iron. With the latter, again, lower coke, limestone and labor and the vanished profit take their goodly share from the former selling price. Let us put the whole at, say, \$3 for the sake of illustration. The billet maker secures all this and must add the amount represented by waste of iron in conversion—say 40

cents—making the lessened cost to him on his principal raw material, say, \$3.40. He also takes advantage of the necessities of the squeezed maker of ferromanganese, he uses cheaper coke, gets lower labor and supplies, and yet must abandon profit if he wants to capture any business. The end is that there is an apparently enormous decline in the steel billet from \$22.50 to \$18.50 in a year. To it, however, every one along the whole line has contributed. Apparently small accretions have swollen to one great total, which represents the measure of woe of all tributary industries.

We are far from underrating the hardships which labor must bear in such times as these, when the consumer may be supposed to be enjoying the maximum of advantages. The principal source of suffering to the workmen is the lack of employment rather than the lowering of the rate of wages. But after all the blows fall hardest upon the owner of capital who obtains no returns, and in only too many cases sees the fruit of years of work and skill swept away partially or wholly.

A consideration of the factors which have contributed to prevailing low prices at the same time constitutes a warning for the future. When the time does come, as it will, that wages are restored, and every one along the line finds that conditions warrant the adding of a profit to his cost price, then, too, the additions will be cumulative and will be represented by jumping prices. It may be premature now to speak of such a contingency, but it is bound to come, and will take those by surprise who fail to watch the signs of the times and who do not appreciate the fact that it is not alone the last seller in the line, but every one before him, back to the producers of raw material, who is entitled to living profits.

The final report of the Committee on Standard Rail Sections, appointed by the American Society of Civil Engineers, has now been issued. The high standing of the members of that body, among whom were several thoroughly familiar with the manufacture of rails, gives great weight to their decision, and will, it is hoped, bring about a wide acceptance of their standards. The hair-splitting ingenuity which railroad engineers have developed in the evolutions of variations in rail sections has been the source of an enormous waste of money to the railroads of this country, and has greatly hampered the operations of the rail mills. With one line of standard sections they could easily roll for stock in dull times, the capacity of the mills could be more regularly employed, and cost would be lowered, to the advantage of buyers and sellers alike. We are not quite sure but what it would be a wise move on the part of the mills to make a difference in price between standard and special sections, and thus encourage the introduction of the former.

Structural Work in Chicago.

The financial depression has not interfered with the progress on structural work in Chicago which was under contract when the panic struck the country last spring. Large undertakings were then in hand, one of the most important of which was the Metropolitan Elevated Railroad, traversing the west side of the city. This is the enterprise for which 50,000 tons of steel shapes were purchased in a single contract. The building of the road has been steadily pushed, although large expenditures were necessary in acquiring the right of way and paying for numerous buildings that had to be removed. It would not have been surprising if this work had been stopped until the financial situation improved, but there has not been even a temporary check to the progress of the enterprise. On the contrary, there is ground for believing that important branches may be built as soon as the main road is completed and the system made more extensive than that covered by the contracts thus far placed.

The Lake Street Elevated is also taking considerable quantities of structural material in the effort to make ready for the opening to traffic of that road at an early day.

In the line of office buildings, the most ambitious structure now in hand is the Stock Exchange building, at the corner of Washington and La Salle streets. This huge edifice is gradually disclosing its great proportions to the eyes of the public, absorbing hundreds of tons of steel in its frame work. Other large buildings begun in better times than these are also progressing toward completion.

There are a few notable instances in which large office buildings have been undertaken since the depression set in. The projectors of these enterprises were not obliged to go forward with them, but could have continued to receive fair rentals from the old buildings occupying such sites. Nevertheless they have gone ahead as though times were good and money was easy. Our Chicago market reports have quite recently referred to the large purchases of structural material made for these buildings. Visitors to Chicago express their surprise at the important improvements of this character which they see in progress, so many of which bear evidence of having been very recently undertaken. The projectors of other large office buildings are known to be making arrangements to erect them as soon as leases held by present tenants shall expire. One of these is a very large structure which will be a notable addition to Chicago's great buildings.

The quiet confidence displayed by the investors in these projects is having some effect on other classes of business men, who have been inclined to take alarm at the continuance of disturbing influences and have dreaded something worse to follow the experiences through which we have

passed. Possibilities of considerable structural work are also opening up in connection with the elevation of steam railroad tracks throughout the city, which plans are in some instances now being drawn by railroad engineers. The Chicago authorities, backed up by a strong public sentiment, are persistently compelling the railroad companies to study the question of track elevation for the protection of the lives of the citizens and demand its early solution. This means the consumption of a very great deal of iron and steel when the work shall have been actually undertaken.

Chicago has in recent years been such an important factor in the consumption of structural material that it is pleasant to note these evidences of a continuance of the demand. The immediate future may perhaps not bring forth enough new enterprises to keep a single structural mill in regular operation, but if all our large cities were doing equally well the outlook would be vastly more promising for those dependent on this class of business.

Copper as a Carrier of Silver.

There is every probability that copper will become a more and more important carrier of silver in the next few years. Until now lead has practically monopolized that position in this country. The smelting of lead ores in the Rocky Mountain territory has developed into a great industry by coupling with it the extraction of the precious metal from what are silver ores without any of the base metals. The lead has simply carried the silver along through the smelting process, to be separated in the final desilverizing process. That function of a carrier copper seems now destined to dispute to some extent, having for a long time been used in a somewhat different way as a carrier of gold.

Formerly copper smelting was a long and tedious process, and the separation of silver in it did not pay unless the red metal contained upward of 30 ounces of silver to the ton. Modern methods have brought about a complete revolution. The Bessemerizing of copper matte has supplanted the frequent remelting, and has robbed the former formidable impurities of much of their terror. The electrolytic refining process has made it possible to produce high-grade metal from impure raw material, and has enabled refiners to separate gold and silver from the copper cheaply and completely.

The result of these achievements is not alone that pure electrolytic copper is obtained from material which formerly could not be made to yield first-class metal, but also that silver extraction can be coupled with copper smelting. In other words, the growing importance of copper as a carrier of silver will aid the working of a number of deposits of argentiferous ore, and the profits arising from that business will strengthen the position of many copper producers. It will en-

able them to stand up under the stress of low prices better than they could otherwise do.

This electrolytic refining of coarse copper can be done very cheaply. We understand that a foreign works has offered to refine in this manner at \$13 per net ton, so that a silver contents of 20 ounces per ton of copper would pay for the whole cost of refining.

It may be noted incidentally that these more recent developments give promise of adding quite an important source to silver production and threaten to add to the discomforts of the enthusiastic, though misguided, lovers of the white metal.

An interesting possibility arises in the same connection. It is well known that the Lake Superior native copper contains varying amounts of silver. The metal of one of the largest producers formerly ran as high as 30 ounces per ton. The silver contents of the copper of the greatest Lake mine ran 10 to 12 ounces. It is not impossible that at no very distant day we may witness the spectacle of Lake copper companies treating their "minerals" by the electrolytic process and finding in the silver recovered a very comfortable addition to revenues.

An epidemic of frightful railroad disasters seems to have broken out. In the month of September thus far there have been no less than four terrible accidents, as follows: On the Boston & Albany, at Chester, Mass., in which 17 were killed and 28 injured; on the Pennsylvania, at Colehour, Ill., in which 13 were killed and 17 injured; on the Illinois Central, at Manteno, Ill., in which 8 were killed and 18 injured, and on the Wabash, at Kingsbury, Ind., in which 11 were killed and 15 injured. These accidents have occurred on some of the best railroads in the country, having the highest reputation for careful management. In nearly every case, however, the cause can be traced to some one person who either forgot something he should have done or else perpetrated a fearful blunder through sheer carelessness. Wholesale denunciation of railroad managers is quite popular now, under such circumstances, but the real culprit is the forgetful operator or the careless trainman. The best system in the world can be nullified by the man whose duty it is to carry out some petty detail.

Before the International Convention of Factory Inspectors, recently held at Chicago, Rufus R. Wade, chief of the Massachusetts district police, read a paper on "The Inspection of Boilers Under State Supervision," in which he made some startling allegations in reference to the condition of affairs in that State and charges of gross criminal carelessness on the part of owners of steam boilers. He alleged that the lives of hundreds of men are in constant jeopardy owing to the dangerous condition of boilers, often located in the midst of thickly populated tenement districts and crowded factories, and urged the need of a thorough inspection under State supervision.

CORRESPONDENCE.

The Tin-Plate Report.

To the Editor: We would rather enjoy your comments in issue of 14th inst. respecting the information given out by the Bureau of Statistics were not the evident twisting of reports too serious to be laughed at. Possibly all American manufacturers may take earnest exception to this report. We speak for our own interests, as embraced in our own factory in this city and the plant of the Blairsville Rolling Mill & Tin Plate Company, at Blairsville, Pa., the entire output of which we market. We know of no theory from which it is proper to speculate upon annual output upon the basis given in this report. At Blairsville was erected an entirely new plant, consisting of hot and cold rolling mills, heating and annealing furnaces and pickling machines, together with a complete tinning house. This plant only began practical operation in the quarter ending March 31, 1893, and to make an estimate of its annual capacity (as attempted in this report) upon the basis of three and one-half times the actual output of the quarter, most of which was passed before the actual completion of this plant, is evidently improper. As the Bureau of Statistics had in hand long since the actual returns from the quarter ending June 30, it may be pertinent to inquire why same are not published. We may state that in a single month of the quarter ending June 30, we delivered from Blairsville to consumers a quantity of finished plates in excess of this Bureau of Statistics' estimate of the annual output of this mill. Every sheet coated at Blairsville is rolled in the mill there, the output being the product of a complete American plant. Within a few days the additional mill erected at the Blairsville plant has been put in operation, thus giving at the present time a daily output of 300 boxes.

Very respectfully,

JAMES B. SCOTT & Co.,
PITTSBURGH, PA., September 22, 1893.

To the Editor: We notice in your journal a report of the domestic manufacture of tin and terne plates. We are pleased to note that in publishing it you take the opportunity to state that it is more or less inaccurate. As far as our firm is concerned the statements are inaccurate—indeed, are ridiculously so. For instance, our capital invested is put down as \$2000. As this represents just one-fifteenth of the cost of the real estate on which our works are erected, to say nothing of buildings, machinery, &c., it is needless for us to comment further on the value of such reports to the public. Yours truly,

MERCHANT & Co.

PHILADELPHIA, September 25.

The Queen and Crescent Route has issued pig-iron tariff No. 33, effective September 16, from which we quote the rates between the more important points. From Dayton and Rockwood, Tenn., the rates are as follows: To Columbus, Ohio, \$2.70; to Minneapolis, Minn., \$4.90; to Muncie, Ind., \$2.80; to Zanesville, Ohio, \$2.95. From Chattanooga, Tenn., the rate is 20 cents advance over above figures, and from Rising Fawn, Ga., and Fort Payne, Ala., 45 cents advance.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., September 26, 1893.

The majority of the Ways and Means Committee, in their free raw material tariff reform scheme, find themselves vigorously confronted by a very serious opposition from an unexpected quarter. Since the hearings closed the committee have been receiving written protests which supplement the oral statements previously submitted.

The most formidable of this opposition comes from the very State and district of the chairman of the committee, against the removal of the 75 cents per ton duty on coal.

The very cornerstone of the projected tariff reform is the placing of coal, iron ore and wool on the free list. In opposition to the first the committee find themselves antagonized by such men as ex U. S. Senator Henry G. Davis of West Virginia, the Virginia State Senator Lumb of Norfolk, who points out the effect it will have on the coal traffic of the Norfolk & Western system, with tidewater outlet at Norfolk, and the fields in Southwestern Virginia. Erskine Miller of Staunton shows that the enormous and growing output of the Chesapeake & Ohio Railway, which finds its chief market in New England, would be ruined.

The committee are also hearing from Maryland, Georgia and Alabama, which are loud for protection against Nova Scotia, and distant California, Oregon and Washington are demanding protection against the coal of British Columbia.

The development of such a threatening attitude from the Southern States, which have hitherto been relied upon as "solid for tariff reform," has caused Chairman Wilson to remark: "We are confronted on the threshold of our labors by such a conflict of interests in the different sections that we may not be able to complete the bill as soon as we expected."

"No, there is no disposition to change the line of policy which has been marked out. If we yield on coal, iron ore or wool, the chief articles which can be classed as raw materials are surrendered and the reform we propose falls."

The only chance the varied interests which are attacked in the bill can have will be on the floor of the House, and, if they fail there, in the Senate.

It is now time to begin preparations for this fight. It is safe to assume that every industry itemized under the tariff act of 1890 will come in for a share in the "reform and revenue only" movement.

The majority of the committee will stand together in reporting whatever sort of bill they agree upon.

This will include Mr. Turner of Georgia, Mr. Whiting of Michigan, and Mr. Stevens of Massachusetts, who have each said that he will not permit the great industries to be attacked. They have not indicated, however, where they draw the line, whether at a scaling down of 25 or 40 per cent. on existing duties.

It can be mentioned authoritatively that the reductions in the present rates will not be less than 25 per cent.

The sub committee—that is, of the majority—are holding daily meetings in the preparation of their bill. Their principal work thus far has been confined chiefly to finally determining on

all the articles which are to be placed upon the free list.

The sub-committee charged with the preparation of the Tariff bill will first report to their colleagues of the majority, and when their work is approved by them the minority will be called in to demur and prepare a minority report.

If the metallurgical industries propose to take any action in self-defense in common with other industries it is none too soon for them to organize.

They have been sufficiently advised from remarks by members of the committee that their statements before the Committee on Ways and Means were all very well, and very forcibly presented their side of the question, which had been heard before, but that the bill which would be reported in due course will be constructed on lines for revenue only.

Under the leadership of Mr. Randall of Pennsylvania the Wood and Morrison bills were antagonized. It would be possible to thwart the Wilson bill if it comes out of the committee in the shape in which he says it will.

The numerical strength of the parties in the House is:

| | |
|------------------|-----|
| Democrats..... | 220 |
| Republicans..... | 127 |
| Populists..... | 9 |
| Total..... | 356 |

It would thus require a charge of about 54 votes from the majority and Populist on a full House.

If the States of West Virginia, Virginia, Maryland, Alabama and Georgia, which cast 50 votes in the House, could be united with the Northern votes of the majority, the tariff reform bill reported by the committee could be modified to suit the conservative views of the country as a whole on tariff legislation.

The most serious question in such a contest would be that of leadership. There is where the conservative sentiment of the House will, in all probability, be permitted to go by default. There is not a member of the majority, as far as now known, who would be likely to have the courage, if he have the ability, to lead in such a conflict.

The opposition, however, to the bill will be easier organized in the Senate, as men like Gorman, Brill and McPherson are not likely to permit the industries of their States to be sacrificed to any crude or theoretic notions of tariff reform legislation.

Merchant & Co., Philadelphia, are offering to the trade American continuous roofing plates manufactured by the American Tin Plate Machine & Mfg. Company according to the Buckman process, which was described in *The Metal Worker* some time ago. The chief feature of the process is the production of a continuous sheet of terne plate, the machine cleaning, coating and joining the sheets automatically. This roofing plate is made and sold in rolls 60 feet long and 20 inches wide, containing 100 square feet. The rolls when ready for shipment are in convenient shape, being in the form of a cylinder about 10 inches in diameter and 20 inches long. An inspection of the sheet shows that the coating has been evenly distributed, and is without break or spot. Apparently a good deal of tin is used in the mixture, giving a bright look to the plate, and the coating is of even thickness down to the extreme edge. The convenience of having the tin furnished in a long strip will

be appreciated by the roofing trade. It should be further observed that the sides of the strip are absolutely straight and parallel, which is sometimes a difficult result to accomplish in joining ordinary sheets in the shop if they do not happen to be accurately squared. If the rolls were crated or incased in some way so as to protect the outer layer from scratches and other marring during transit, the improved appearance would be worth the outlay.

Effect of the Panic on the Banks.

It may well be doubted whether many observers of the late financial cyclone realized that more than 549 banks, banking institutions and mortgage-loan companies were obliged to close their doors either temporarily or permanently.

Reports to *Bradstreet's* concerning bank and banking suspensions from January 1 to August 31, 1893, presented in detail herewith, are found to consist, with few exceptions, of those who succumbed to financial straits or panic incident to May, June, July and August of this year. The report does not, however, take cognizance of banking troubles which may have taken place in South Dakota, as a State law there practically prohibits the gathering of information of this nature. Inasmuch as our reports of dates of resumption of suspended banks are not as complete as we expect to make them, no particular stress is placed on that feature of the accompanying exhibit at this time.

The following summary gives the totals of the number of banks suspended, the number thus far reported resumed, with estimated totals of assets and liabilities:

Bradstreet's Reports of Banks Suspended in Eight Months of 1893, With Assets and Liabilities.

| States. | No. suspended. | No. resumed. | Assets. | Liabilities. |
|-------------------|----------------|--------------|---------------|---------------|
| New England..... | 12 | 1 | \$2,192,875 | \$1,319,000 |
| Middle..... | 28 | 3 | 9,885,188 | 10,762,875 |
| Western..... | 109 | 36 | 59,592,609 | 46,382,529 |
| Northwestern..... | 145 | 14 | 48,964,720 | 50,337,336 |
| Southern..... | 84 | 11 | 22,477,490 | 21,275,539 |
| Pacific..... | 72 | 23 | 32,120,385 | 25,178,339 |
| Territories..... | 9 | 4 | 1,562,000 | 1,426,000 |
| Totals.... | 549 | 94 | \$176,794,417 | \$165,731,618 |

The extraordinary effect of the "panic of 1893" on the banks is here seen in a marked excess of total assets of suspended banks as compared with total liabilities in all sections of the country, except in the middle and in the New England States. But embarrassed banks in the middle and New England States, from which the bulk of loanable domestic capital is obtained, furnish a total of only \$21,081,875, or one-eighth of the grand total of liabilities of embarrassed banks this year, of which two trust companies in New Hampshire and two banks in New York State account for almost one-half, nearly \$10,000,000.

The \$46,382,529 banking liabilities reported from eight Western States amount to nearly 28 per cent. of the grand total, as compared with the 12½ per cent. from only six Middle and New England States, and seven Northwestern States report a still heavier share of banking liabilities, fully 30 per cent. of the whole. Banking disasters in South-

ern States furnish about 12 per cent. of the aggregate liabilities of this variety this year, as much as the middle and New England States, while the Pacific States furnish even a larger share, 15 per cent.

The total number of banks embarrassed in each class, by division of States, is reported as follows:

Distribution of Number of Banks Suspended.

| States. | National. | State. | Savings. | Trust Co. | Private | Mrg. inv't. | Totals. |
|----------------------------|-----------|--------|----------|-----------|---------|-------------|---------|
| New England.. | 2 | 1 | 3 | 3 | 1 | 2 | 12 |
| Middle | 3 | 9 | 1 | .. | 15 | 28 | 28 |
| Western..... | 45 | 52 | 17 | 2 | 75 | 199 | 199 |
| Northwestern. | 38 | 45 | 10 | 5 | 45 | 145 | 145 |
| Southern..... | 34 | 20 | 6 | 1 | 23 | 84 | 84 |
| Pacific..... | 24 | 29 | 7 | 1 | 11 | 72 | 72 |
| Territories.... | 5 | 2 | 1 | .. | 1 | 9 | 9 |
| Totals | 151 | 164 | 45 | 12 | 171 | 6 | 549 |
| P. ct. of whole Number.... | 27 | 30 | 8 | 2 | 31 | 1 | .. |

From the foregoing it becomes apparent that private, State and national banks suffered in the order named, so far as being compelled to suspend is concerned. Thus, the suspensions of private banks in Western and Northwestern States alone numbered 140, about one-fourth of the total of all banks suspended in all States, while the 103 State banks which suspended in Western and Northwestern States are almost one fifth of the total which suspended throughout the country. The number of Western and Northwestern national banks which suspended was only 15 per cent. of the total number of banks which suspended.

A corresponding exhibit, with respect to the total liabilities of each class of banks which suspended, is given as follows:

Distribution of Liabilities of Suspended Banks.

| | National. | State. | Savings. |
|--------------------------------------|-----------------|--------------|--------------------|
| New England | \$781,000 | \$225,000 | \$1,150,000 |
| Middle..... | 2,043,000 | 6,134,234 | 122,996 |
| Western..... | 24,181,794 | 5,165,500 | 7,374,000 |
| Northwest'n. | 17,070,357 | 14,264,724 | 1,243,763 |
| Southern..... | 14,619,000 | 2,210,539 | 735,000 |
| Pacific..... | 11,958,232 | 6,522,271 | 5,358,804 |
| Territories... | 843,000 | 233,000 | 250,000 |
| Totals ... | \$71,406,383 | \$34,755,268 | \$16,234,563 |
| Per cent. of aggregate liabilities.. | 43 | 21 | 9 |
| | Trust comp'n's. | Private. | Mortgage and loan. |
| New England | \$7,413,000 | | \$750,000 |
| Middle..... | | \$2,462,645 | |
| Western..... | 310,000 | 8,981,235 | 770,000 |
| Northwest'n. | 13,565,000 | 3,973,492 | 270,000 |
| Southern..... | 760,000 | 2,951,000 | |
| Pacific..... | 290,000 | 1,049,032 | |
| Territories... | | 100,000 | |
| Totals | \$22,338,000 | \$19,517,404 | \$1,790,000 |
| Per cent. of aggregate liabilities.. | 13 | 11 | 1 |

From the foregoing it appears that the private banks of the country furnished much the larger proportion of those obliged to suspend within the past few months, 31 per cent., but that the liabilities of suspended private banks were relatively small, only 11 per cent. of the grand total of liabilities of all banks suspending during that period. State banks suspending rank second in point of numbers, furnishing 30 per cent. of the grand total, with

only 21 per cent. of the liabilities. Suspended national banks amounted to 27 per cent. of the total number of banks embarrassed, but their liabilities formed 43 per cent. of the aggregate debts of all banks reported embarrassed. Savings banks which suspended make relatively the more normal showing, 8 per cent. of the whole number and 9 per cent. of the gross liabilities. There being so few mortgage investment company embarrassments to report, like comparisons with respect to them are of little value. The trust company exhibit is hardly of more interest in this connection for like reasons.—Bradstreet's.

OBITUARY.

HON. WILLIAM S. WILCOX.

Hon. William Seward Wilcox, senior member of the Wilcox Hardware Company, Adrian, Mich., died on the 15th inst. Mr. Wilcox was born in Riga, Monroe County, N. Y., on April 25, 1819. When he was yet a child his parents moved into the town of Bergen, Genesee County, where he lived on a farm, his father at the time managing a hotel, a stage line and the local post office. In 1836 the son left the old home and started West. He secured employment as a clerk in a dry goods store at Milan, Ohio, where he remained for a short time. Mr. Bidwell, the proprietor of the store, removed his stock of goods to Adrian, Mich., during the same year and Mr. Wilcox accompanied him. In 1840 Mr. Wilcox became a partner of Mr. Bidwell, and the firm of Bidwell & Wilcox continued until 1844, when the latter disposed of his interest to the former. In the spring of that year Mr. Wilcox began business for himself, continuing it until 1855. In that year he sold out his stock. Soon after discontinuing the dry goods business he started a hardware store under the firm name of Wilcox & Chappell, which firm existed for about 18 months, after which, purchasing the interest of Mr. Chappell, Mr. Wilcox conducted the business alone until 1867, when his brother, Henry Wilcox, became his partner. This firm existed for five years under the style of Wilcox & Bro., and was then changed to Wilcox, Bro. & Co., on the admission of George A. Wilcox, Mr. Wilcox's son, as a partner. Mr. Wilcox continued his interest in the business, although since 1880 his brother and son have managed it, together with William A. Staniford, who, in March, 1889, on the organization of the Wilcox Hardware Company, was added to the firm. In 1865 Mr. Wilcox was elected Mayor of Adrian. In the fall of 1870 he was chosen State Senator, and held the office for one term, during which time he was chairman of the Finance Committee. In 1869 he was appointed State Prison Inspector by Governor Baldwin, and was immediately chosen chairman of the board. In 1866 Mr. Wilcox was chosen president of the Michigan State Insurance Company, which position he filled for 17 years.

The most important move in iron and steel trade circles during the past week was the action taken by the Finishers' Association, at their meeting held in Youngstown, Saturday, September 23. It was decided to accept the 10 per cent. reduction in wages asked for by the manufacturers several weeks ago, but refused by the workmen at that time. It is now probable that a conference will soon be held and an agreement

reached. The disposition of the finishers and the Amalgamated Association to adjust their differences will, no doubt, be a means to this end, but a settlement of the wages question is not considered certain, as the continued depression in prices has caused the manufacturers to demand a still further reduction than 10 per cent. If a settlement is made and operations commenced, fully 6000 men will be directly or indirectly concerned in the Mahoning Valley.

PERSONAL.

Robert M. Stevenson, formerly superintendent of the Britton Iron & Steel Company of Cleveland, is now connected with the Midland Steel Company of Muncie, Ind.

The only American proposed for membership in the Iron and Steel Institute at the Darlington meeting is Chas. H. Terry of Chicago.

The impetus given to the sheet-rolling industries of Eastern Ohio during the past two weeks continues, but its force is not increased. The sheet mills at Niles, Canal Dover, New Philadelphia and Cambridge are in operation, but the order files do not present a bulky appearance. If it were not for a fair demand for galvanized sheets matters would be dull in the territory named. Iron and steel roofers are doing some business and in this line it is reported that the demand for galvanized stock shows a marked increase. Several concerns have curtailed their expenses by calling in traveling men, and do not expect to send them out again this season. The New Philadelphia Wire Nail Company have started their works, giving employment to about 300 hands, and other industries have made slight additions to their working force, but neither in rolling mills nor factories is finished stock being accumulated. Goods manufactured are for pressing necessities only. It is reported that a new vein of the famous Black Band iron ore has been found in the hills of Tuscarawas County near Newcomers-town. It is said to be 10 feet thick.

Business in the manufacturing towns of Central New York is not as bad as has been painted. At Herkimer the Quackenbush Gun Factory has been running light for some time, though the prospects in that line are somewhat brighter and a fair fall trade is expected. At Ilion A. M. Ross & Co., who conduct a general machine shop, foundry, and manufacture a line of farm implements, are running on short time, but their business has been fair. In connection with this shop is the McMillan Type-Setting Machine Company, who have worked steadily through the season and have orders ahead. At Rome, N. Y., the brass and copper mills have been running on short time, but expect soon to be running full. The Fitch Gear Company had a larger August sale than last year and predict a good fall trade. The principal manufactories at Watertown, N. Y., are paper machinery, wagons, air brakes and steam engines. The Bagley & Sewall Company booked several large contracts for paper machinery. The Brake Company, after paying considerable sums in premiums on currency needed to make up the pay roll, laid off about half of the 500 hands usually employed. The steam-engine company find collections slow and have to work on half time. None of these manufactories are looking for continued depression.

MANUFACTURING.

Iron and Steel.

The furnace of the Tonawanda Iron & Steel Company of Tonawanda, N. Y., of which W. A. Rogers is president, was not blown out, as reported, but has simply been banked for 60 days in order to work off the stock of pig iron accumulated during the depression.

Stephen N. Noble of Anniston, Ala., has been in Middlesborough, Ky., recently examining the Watts furnaces with a view of leasing the plant, and it is stated that he will soon make a proposition to the Watts syndicate. Mr. Noble has been recently acting as receiver for the blast furnaces at Embreeville, Tenn.

The bondholders of the Southern Iron Company, Nashville, Tenn., have adopted the report of the committee appointed to formulate a plan for the reorganization of the company. The report recommended in substance that the Central Trust Company of New York, trustee under the company's general mortgage, be requested to advertise and sell all the company's realty embraced in the mortgage, and that a purchasing committee be appointed to bid on the property for and on behalf of a new company to be organized under an Alabama chapter; that in organizing under this charter the present indebtedness be reduced to \$2,000,000; that of this there be given the holders of present bonds 35 per cent. on the dollar of new bonds, and the remaining 65 per cent. in preferred stock. This will so lessen the fixed charges to be paid by the company that no trouble will be hereafter experienced. All sums over and above what is necessary to pay the interest of the new bonds will go as a dividend on the preferred stock.

The employees of the Cleveland Rolling Mill Company's works, at Newburg, Ohio, have accepted a reduction in wages of 15 per cent.

The Glasgow Iron Company of Pottstown, Pa., are now operating their works with a full force of men.

No. 1 blast furnace, operated by Coleman & Brock, at Lebanon, Pa., has been banked. It is stated that all the furnaces in North Lebanon are now idle—a condition of affairs not experienced in that section since the war.

Preparations are being made to blow in the Mingo Furnace of the Junction Iron Company, in Jefferson County, Ohio.

The Phoenix Iron Company of Phoenixville, Pa., have recently received some good-sized orders, which make the prospects for a busy winter very promising. Recently the force of 600 men has been doubled. In busy times the company employ about 2400 men.

The Paige Tube Works of Warren, Ohio, have resumed operations at a reduction in wages of 10 per cent. For the present the works will be operated but three days in a week.

On Saturday, September 23, the employees of the Republic Iron Works, manufacturers of iron and steel sheets, South Side, Pittsburgh, Pa., were notified that operations would be resumed at once. During the shut down extensive repairs were made, and the works are now in shape for a steady run.

It is reported that the rolling mills at Pomeroy, Ohio, have commenced operations after nearly three months' shut down.

The last of several conferences held between the Shenango Valley Steel Company, New Castle, Pa., and their employees was held Friday, September 22, President M. M. Garland of the Amalgamated Association being present. Both sides were prepared to make concessions, and a satisfactory agreement was reached. The scale was signed, and it is probable that orders will soon be given to start up the works. It is also stated that as soon as this occurs the New Castle Steel & Tin Plate Company will commence operations at their new plant. Altogether about 1000 hands will be benefited.

Contracts have been let for the new buildings and a part of the equipment for the Ashtabula Steel Company, Ashtabula, Ohio. The buildings, 17 in all, will be erected by the Shiffler Bridge Company of Pittsburgh, and will be constructed of steel. They consist of the following structures: The main building, 380 x 100 feet and 28

feet high, containing the open-hearth furnaces; the reducing buildings, two in number, wings of the main structure, 340 x 65 feet each and 14 feet high, and the blooming mill, 420 x 60 feet, 25 feet high, with two wings 240 x 20 feet and 20 feet high. When they are working to their full capacity the above buildings will be duplicated, and the two plants will then have a total capacity of 2000 tons of steel billets per day. There will be ten gas houses, six of them 46 x 65 x 17 feet high, and four 25 x 26 x 17 feet high, and two boiler houses, 30 x 100 x 20 feet high, containing 20 120 horse-power boilers. Power will be furnished by two 1800 horse-power engines made by A. B. Farquar & Co., who will also furnish the boilers. The former will cost \$15,300, and the latter \$15,700. The Industrial Iron Works of Bay City, Mich., will furnish the electric traveling cranes, consisting of two three-motor cranes of 40 tons capacity and two three-motor cranes of 10 tons capacity. The largest of these will have a traversing speed of 100 feet per minute with load. Their cost will be \$26,600. The company hold options, it is said, on 3300 acres, and the site selected for the works is one well adapted to the purpose both on account of its natural advantages and its accessibility to railroad communication. It is expected that the buildings will be ready for occupancy in January. Their contract cost will be \$71,536.

The sheet mills and puddle mills of Geo. W. Johnson, New Castle, Pa., are in full operation, but the demand for their finished material is only moderate compared with what it usually is at this season of the year.

Repairs at Rosena Furnace, New Castle, Pa., are progressing rapidly.

No. 1 blooming mill and rail mill at the Pennsylvania Steel Company's works, at Steelton, Pa., shut down last Saturday.

Several hundred men have been given employment by the resumption of the Altoona Rolling Mills, at Altoona, Pa. The works had been idle for the last three months.

After two months of idleness, the rolling mill of the Valentine Iron Company, Bellefonte, Pa., has again been put in operation.

It is stated that George D. Wick of Youngstown, Ohio, has made a proposition to purchase the plant of the Chicago Steel Works of Chicago. The works, which made a specialty of agricultural shapes, are now in the hands of receivers.

The East Lebanon Iron Company, whose plant in East Lebanon, Pa., was destroyed by fire in the early part of April, will rebuild on the old site.

Potter & Snell, Deep River, Conn., have recently increased their facilities for turning out cold-reduced wire to order. This concern makes a specialty of reducing wire to any size and to needle points.

The National Tube Works of McKeesport, Pa., are preparing to put in operation the No. 4 puddling mill. With this department running the entire plant will then be in operation, with the exception of one finishing mill.

The strike at the Marshalltown Iron Works, Wilmington, Del., is still on. The men refuse to accept a 10 per cent. reduction in wages.

The strike at the Lockhart Iron & Steel Company's works, at McKee's Rocks P. O., Pa., has been declared off, and all the old employees who could find places returned to work. While the company will continue to pay Amalgamated prices, that association will not be recognized. About 400 men are employed when the mills are running at full capacity.

Nine puddling furnaces were started at the mills of the Burden Iron Company's works, Troy, N. Y., September 20. The 14-inch train at the merchant mill will soon be lighted up.

At an informal meeting of the creditors of the Oil Well Supply Company of Pittsburgh, held in that city last week, John Eaton, receiver, stated that the assets exceeded the liabilities by more than \$1,000,000. No definite action was taken at the meeting, but it is stated that creditors whose claims aggregate 40 per cent. of the entire indebtedness of the firm have agreed to grant an extension.

Thomas H. Thorne, assignee of the Duquesne Tube Works Company of Pittsburgh, with works at Duquesne, Pa., has been ordered to pay to the Tyrone Iron Company, Tyrone, Pa., \$23,424.77, and amounts less than \$500 to each of the creditors who refused to sign the papers granting the firm an extension. The assignee was ordered to

re-convey the remainder of the assets to the Duquesne Tube Works Company and make a report of his transactions to the Court, upon the confirmation of which he will be discharged.

Last week the Pittsburgh Forge & Iron Company of Pittsburgh, with works in Allegheny, Pa., started up their plant with non-union men, and hereafter will not sign the scales of the Amalgamated Association, and so far have experienced no difficulty in securing a full complement of men. The plant of this firm has been idle since June 30 last, the date of the expiration of the Amalgamated Association scale.

At the annual meeting of the stockholders of the Brown, Bonnell Iron Company, held in Youngstown, Ohio, last week, the following directors were elected: Samuel Mather, Dan. P. Eells, H. C. Baughman, Robert McCurdy, John I. Williams, Henry Wick and Joseph Forker. The directors organized by electing Samuel Mather, president; Robert McCurdy, vice-president; John F. Taylor, treasurer; W. P. Williams, secretary; John I. Williams, general manager.

Last week the strike at the Tenth street mills of the Oliver Iron & Steel Company, South Side, Pittsburgh, was declared off, the old men making application for their former positions. This strike was brought about by the refusal of the firm to sign the Amalgamated Association scale, but agreeing to pay scale rates.

Machinery.

The firm of Edwin Harrington, Son & Co. of Philadelphia, manufacturers of hoisting machinery, has been dissolved, and the interests of the partners purchased by a corporation composed of John A. McGregor, formerly assistant superintendent of the Brown & Sharpe Mfg. Company of Providence, R. I.; H. S. Haskins, M. H. Harrington and E. L. Harrington, the partners in the late firm, and M. J. Morrissey, Robt. F. Scott and Roger Sherron, formerly with the late firm, who will continue the business under the name or style of Edwin Harrington, Son & Co., Incorporated. The officers of the company are: H. S. Haskins, president; M. A. Harrington, treasurer, and Roger Sherron, secretary.

The Rider Engine Works, at Walden, N. Y., have resumed with a full force on full time.

Dennis Long & Co. of Louisville, Ky., have announced a reduction of 10 per cent. in the wages of the 400 men employed in their foundry.

The Richardson & Morgan Iron Foundry, at South Norwalk, Conn., has assigned for the benefit of creditors.

Daniel Kelly, dealer in new and second-hand machinery at 51 North Seventh street, Philadelphia, has made an assignment to John E. McCully. No statement of assets and liabilities has yet been prepared.

It is stated that the Cardwell Machine Company will erect a new plant at Richmond, Va., at a cost of \$100,000. The entire plant will cover an area of 160 x 220 feet.

The Pittsburgh Tool & Steel Company have been chartered at Harrisburg, Pa., with a capital stock of \$100,000, the directors being John C. Jamison, David H. Summers, Richard W. Bailey, David P. Thomas and Alex. M. Johnston. The plant of the Greensburg Steel Company, at South Greensburg, Pa., was recently purchased by these parties, which leads to the belief that these works will shortly be put into operation.

The Flemington Iron Works of Flemington, N. J., which have been idle for ten months, will be put into operation on October 1 by John Foren of Quakertown, Pa., who recently bought the works at sheriff's sale.

The Vulcan Iron Company of Toledo, Ohio, will not erect a new plant this year, as contemplated, but will probably do so some time during the coming year. Business has been fair with them during the summer, 70 men out of a regular force of 100 being employed.

The Dwight Slate Machine Company, Hartford, Conn., manufacturers of sensitive drills, milling machines, &c., have recently opened a store at 13 Central row, Hartford, where they will carry a stock of their own machines and a line of machinists' supplies. Their office has been removed to the new store, which communicates with the factory through the rear. This concern have just brought out a special

drill with nine spindles adjustable, for drilling metal bedstead frames.

Articles of incorporation of Caton's Foundry & Machine Company have been filed at San José, Cal. The capital stock of the company is \$50,000, divided into 5000 shares of \$10 each. The Board of Directors for the first year are F. E. Caton, B. T. Bailey, F. B. Warring, W. T. Reese and David Johns.

The schedules of Cummings H. Tucker, Jr., & Brother, dealers in machinery and mill supplies at 126 Liberty street, New York, show liabilities \$33,335, nominal assets \$18,769, actual assets \$11,232.

A receiver has been appointed for the Perkins Machinery Company of Atlanta, Ga., manufacturers of saw-mill and grist-mill machinery.

The Record Foundry & Machine Company of St. John, N. B., have recently added to their molding department a new building 100 x 25 feet, making it one of the largest in the maritime provinces. The company are running all departments night and day.

The Pierpoint Boiler Company of Pittsburgh have just completed the setting up of a 250 horse-power boiler in the plant of the New Philadelphia Iron & Steel Company, at New Philadelphia, Ohio.

The Totten & Hogg Iron & Steel Foundry Company of Pittsburgh, Pa., have received a number of orders recently for rolling-mill machinery, among which is one for a large lathe to be placed in the plant of P. H. Laufman & Co., at Apollo, Pa.

Hardware.

F. W. Coburn, New Durham, N. H., has again started up his knife factory.

The Niagara Cutlery Company have been organized at Niagara Falls, N. Y. The company will make cutlery and find a market for their wares in the silver-plating works of the country.

The foundry of the White Mountain Freezer Company, Nashua, N. H., has been started up on full time.

The Keene Mfg. Co., Marlboro, N. H., have started up their skate works after a shut down of some two or three weeks.

The works of the New American File Company, Central Falls, R. I., started up on the 14th inst.

Quite a number of the bands laid off by the Union Metallic Cartridge Company, Bridgeport, Conn., during the last two months, have returned to work. The shot shell department is working full time with a full force. The prospects for a speedy resumption of work in most of the other departments are promising.

The wire mill of the Oliver & Roberts Wire Company, Pittsburgh, was started on the 19th inst.

The Kappe-Berrian Mfg. Company, Quincy, Ill., have been incorporated. The company will manufacture agricultural implements. The capital stock is \$16,000.

The Casey Nail Factory, at Lewiston, N. Y. is nearly completed.

The plant of Landers, Frary & Clark, New Britain, Conn., started up on the 18th inst. with nearly its full complement of employees.

The foundry of North & Judd Mfg. Company, New Britain, Conn., has resumed after a shut down of 11 weeks.

The Stanley Works, New Britain, Conn., resumed operations on the 19th inst.

The Pacific Iron & Nail Works, Council, Cal., will rebuild that portion of their works which was recently destroyed by fire.

The nail factory of the upper Mount Hope Iron Works, Somerset, Mass., started up on the 15th inst.

The Waterville Cutlery Company, Waterville, Conn., who shut down September 2, have been obliged by new orders to call in a portion of their help. New machinery is being put in and the force of employees will be increased as everything gets into working shape.

The Remington Arms Company, Ilion, N. Y., have started up, working full time with a full set of hands, after more than a month's shut down to half time and a small force.

The Millersburg Axle Factory has been running regularly all the summer, and the

firm have been making a number of improvements. A new steam hammer weighing 16,500 pounds, classed as a 1000-pound stroke hammer, has been placed in the establishment. Oil will shortly be used as a fuel, and about 9000 gallons have been placed in the tank.

The large axe factory at Lewistown, Pa., owned by the Mann Edge Tool Company, is nearly completed. A trial run of the new plant was made on the 18th inst., and it is expected that the entire factory will soon be in operations. The former factory was destroyed by fire five months ago.

The Penn Hardware Company, Reading, Pa., have resumed operations on full time, giving employment to 500 hands.

The Onondaga Hardware Specialty Company were incorporated at Albany on September 23, to manufacture hardware specialties in Syracuse, N. Y. The capital of the new concern is \$40,000 and the directors are William A. Ayers, Oscar A. Houghton and William H. Foss of Syracuse.

John Q. Maynard, 114 Liberty street, New York, manufacturer of dumb waiters and elevators, while participating with most business houses in the annoyances occasioned by slow collections, says he has not booked so many orders for dumb waiters and elevators in the last two years as during the last six weeks.

The Winchester Repeating Arms Company, New Haven, Conn., have resumed operations in full.

Wallace & Sons, Ansonia, Conn., are again operating their lamp department.

The tack factory of the Shelton Company, Shelton, Conn., has been started up.

The T. C. Richards Hardware Company and the Franklin Moore Company of Winsted, Conn., have resumed manufacturing.

H. M. Myers Company, Beaver Falls, Pa., have resumed manufacturing operations.

The Elliott Hickory Bicycle Company are contemplating the removal of their plant from Newton to South Framingham, Mass.

A large addition is being made to the works of the Morse Twist Drill & Machine Company, New Bedford, Mass.

The Goshen Pulley Company, Goshen, Ind., have been reorganized. A plant has been leased and it will be equipped with machinery immediately.

The Boston Woven Hose & Rubber Company, Boston, have purchased the business of the Phelps & Dingle Mfg. Company, Passaic, N. J., and will remove it to Boston.

The Kelly Nail & Iron Company of Ironton, Ohio, have started their mills for a steady run.

The plant of the Eaton, Cole & Burnham Company, Bridgeport, Conn., resumed operations on full time with full force on the 25th inst.

The works of the New York Knife Company, Walden, N. Y., are again in full activity, having resumed on the 25th inst.

The American Brass & Rivet Company, Westfield, Mass., started up their factory on the 22d inst.

Oxford Iron & Nail Company, Oxford, N. J., are making extensive repairs at the mills and mines. The nail mill started up on the 20th inst. with a full working force.

The Sandwich Enterprise Company, Sandwich, Ill., last week filled an order for several of their patent aerating cistern pumps to go to South Africa. One of these pumps is exhibited by the company at the World's Fair in a booth in Machinery Hall, and attracts, we are advised, much attention from visitors.

Miscellaneous.

Fifteen employees in the stamping department of the Bridgeport Brass Company, Bridgeport, Conn., went on strike because of a reduction in wages. About 200 girls who were dependent upon the stamping department are also affected.

The Kentucky Copper & Iron Foundry of Lexington has made an assignment. The principal creditors live in Cincinnati and Indianapolis.

A company has been formed to build a new brass works at Erie, Pa., where brass fixtures of all kinds will be manufactured. A building 150 x 60 feet, three stories high, will be erected.

The Consolidated Mfg. Company of South Milwaukee, Wis., have been organized to manufacture iron and conduct a general drop forge business; capital stock, \$50,000;

incorporators, L. S. Cook, S. H. Ketchum and E. R. Lowmes.

The car and repair shops of the Pennsylvania Railroad Company at Mount Carbon, Pa., have been burned at a loss of \$15,000.

The boiler makers in the Big Four shops at Indianapolis, Ind., quit work on account of a reduction in pay from \$2.75 per day for ten hours' work to \$2.05 per day for eight hours. The boiler makers of the Big Four shops at Urbana, Ill., are all out for the same reason, and there are indications that a general strike of the shopmen on the entire system will result.

The probabilities are that the Thomson Electric Welding Company and the American Projectile Company, both of Lynn, Mass., will be consolidated in the near future if the consent of a majority of the stockholders of both companies can be secured. The two concerns at present are closely allied.

The Louisville & Nashville Railroad Company have reopened their shops, which were recently closed because the men refused to accept a reduction in wages. Only a few of the old employees reported for work, and the outcome of the struggle is still in doubt.

The Singer Sewing Machine Works, at Elizabethport, N. J., will hereafter run but five days a week.

The New London, Conn., Board of Trade have made a proposition to the Bath, Maine, Iron Works to remove their shipbuilding establishment to the Nutmeg State. Among the advantages claimed for the change are cheaper coal and cheaper freights and an exceptionally fine location for shipbuilding yards.

The Newburyport, Mass., Car Works have started up again with only a part of the usual force.

The industries at Depew, N. Y., the new manufacturing suburb of Buffalo, are progressing. It is expected that the new Gould Car Coupler Works will be ready to begin operations in about 30 days. A large number of unusual orders are expected, as the time when all cars should be equipped with patent couplers, as required by law, is near at hand, and a complete system of fire protection has been put in the new coupler plant. A 750-gallon Underwriter pump, made by the Snow Steam Pump Works, will furnish the supply. About 1200 feet of hose will be kept on reels, in the different buildings of the plant. The Buffalo Brass Works are adding to the number of their employees every week and their business is growing rapidly. The roof work of the new plant of the Buffalo Heating & Ventilating Company is rapidly nearing completion. The company have begun drilling wells for a water supply. They will probably begin drilling for gas wells soon, as it is the hope of the company to obtain gas enough to run the plant and heat the homes of the workmen. Depew is growing very rapidly.

Some eight months ago the Huyett & Smith Mfg. Company of Detroit, Mich., shipped to Manchester, England, the largest hot blast dry kiln for timber in Great Britain, the success of which is attested by the receipt of an order for a duplicate plant, through the same source and for a similar industry in Germany. Shipment of the latter was made this week. This company have recently opened an office in London, with an experienced manager in charge, this step being necessary in order to properly look after their growing business, both in England and on the Continent.

The Alabama Pipe Works, at Bessemer, Ala., which have been shut down all summer, resumed operations last week, giving employment to 200 men. It is rumored that the Bessemer Rolling Mill, which has been idle for a long time on account of litigation and other causes, is to change hands shortly, and will be put in operation.

All the employees of the pipe foundry of Dennis Long & Co., at Louisville, Ky., have stood a reduction in wages. The day workmen and laborers have been cut 10 per cent., and the clerical force has been reduced 20 per cent. Nearly 500 men are affected. The reason assigned is the dullness of trade.

The finishers employed by the Bridgeport Brass Company, Bridgeport, Conn., have accepted a reduction in wages.

The Anderson, Ind., Iron & Bolt Works will start up as soon as the necessary preparations can be made.

The Haskell & Barker Car Works, a Michigan City, Ind., employing 1000 men have resumed operations.

TRADE REPORT

Chicago is the only locality which sends fairly cheerful news. From all other producing and distributing centers the reports are blue, in spite of a natural disposition to gather eagerly any indications pointing even distantly to better times. It is useless to deny that a feeling of sharp disappointment is becoming more and more general.

The simple fact is that there is not business enough going, by far, to keep those running even partially who have attempted to start. Every one of the works which have re-entered the list of active producers wants to cheapen cost by securing full employment. The result is a desperate struggle in which prices hitherto unheard of are made. It is useless to plead that special circumstances make such transactions exceptional. They are so numerous considering the small volume of business doing that they control the situation. It may seem paradoxical to state that the easing of the money market has made matters worse, and yet it is true that those who had advanced on merchandise or had given accommodations are putting on pressure now since they believe a course to be without serious danger which a month since would simply have crowded the borrower to the wall.

The banks have tested the Pig-Iron market, but have generally concluded that forced sales now, while they would enable them to recover their advances, would needlessly inflict heavy losses upon the owners of the collateral. There is some evidence, however, that some commission merchants have been forced to sacrifice their furnaces.

In crude Steel and rolling mill products, Pittsburgh, with its splendid facilities for cheap production, is setting the pace. With Bessemer Pig selling at \$11.25 in the valleys, and \$18.50 a full price for Steel Billets, there will be a growing disposition in the West and in the East to let the principal aggressors take the business. In some cases the prices on Finished Iron and Steel have declined in proportion to the fall in crude Steel, but on the whole this has not taken place. It remains to be seen whether the demoralization will become general there too. The concessions on the wages scale may lead to the starting of some of the idle mills.

The Philadelphia Bourse contract has proven to what lengths a Pittsburgh mill will go to surely capture business.

Conflicting reports are current concerning Southern Pig Iron. It is certain that within a short time good blocks of Gray Forge have been bought by Western Pipe works as low as \$6 50, Birmingham, and that even that price has been shaded. Pressing necessities appear to have been relieved in that way, but there is always the danger that some other producer may be forced to sacrifice in his turn.

A survey of the whole field proves that consumption has not recovered sufficiently to give employment to many producers and that therefore the majority have the choice of stopping for a considerable period or of selling below cost. Those who do not have obligations to meet will probably take the former alternative.

Chicago.

(By Telegraph.)

Office of The Iron Age, 59 Dearborn street, }
CHICAGO, September 27, 1893. }

Pig Iron.—At last there are symptoms of a little hardening in prices. This is especially noticeable among sellers of Southern Coke Iron. The companies conspicuous for making low prices recently have either withdrawn from the market or advanced their figures beyond our quotations, so that for the first time for several weeks the figures given below are not subject to concessions for prompt cash or large lots. A few instances have occurred in which large buyers, who failed to take advantage of low offers made them, but who expected the market to go lower, have had the offers withdrawn and have been obliged to pay considerably more than if they had not been so bearish. The same thing has taken place in Lake Superior Charcoal. Offers of hypothecated iron made at very low figures and not accepted have been withdrawn, as the holders are prepared to carry it longer or until the market gets in better condition. Quite a number of season contracts both for Northern and Southern Coke were placed during the last week, and more contracts for local Coke are pending. Consumers generally are talking much more cheerfully, and report that if their trade continues to pick up as it is now doing they will soon need more iron. Quotations are now as follows for cash:

| | | |
|----------------------------------|-----------|---------|
| Lake Superior Charcoal..... | \$16.00 @ | \$16.50 |
| Local Coke Foundry, No. 1..... | 13.50 @ | 14.00 |
| Local Coke Foundry, No. 2..... | 12.75 @ | 13.00 |
| Local Coke Foundry, No. 3..... | 12.50 @ | 12.75 |
| Local Scotch..... | 14.00 @ | 14.50 |
| Ohio Strong Softeners No. 1..... | 15.50 @ | 16.00 |
| Southern Silvery, No. 1..... | @ | 14.50 |
| Southern Silvery, No. 2..... | @ | 14.00 |
| Southern Coke, No. 2..... | 12.35 @ | 12.60 |
| Southern Coke, No. 3..... | 11.60 @ | 11.85 |
| Southern, No. 1, Soft..... | 12.35 @ | 12.60 |
| Southern, No. 2, Soft..... | 11.50 @ | 12.10 |
| Southern Gray Forge..... | 11.10 @ | 11.35 |
| Tennessee Charcoal, No. 1..... | 16.00 @ | 16.50 |
| Alabama Car Wheel..... | 18.50 @ | 18.75 |
| Hocking Valley, No. 1..... | 15.25 @ | 16.10 |
| Jackson County Silvery..... | 16.00 @ | 17.00 |

Bars.—The Calumet mill will be started this week if satisfactory terms can be made with the workmen. Everything hinges now on the stand they take. Enough orders have been secured for something of a run, and the expectation is that after starting other business will come in. The inquiry generally has not been so heavy as during the previous week; nevertheless some business has been placed, and the market has not relapsed into the dullness of July and August. The situation as to the prices remains precisely as noted last week. Mahoning Valley mills quote on the basis of 1.48¢ @ 1.53¢, Chicago, half extras, while near-by mills quote 1.45¢, which is shaded on good specifications. Good Soft Steel Bars are moderately active at 1.60¢ @ 1.65¢, Chicago, for shipment from mill. The demand on jobbers' stock continues good, and prices are maintained at 1.70¢ @ 1.75¢ for either Iron or Steel.

Structural Material.—Considerable figuring is being done on small work, quite a number of buildings of partial Steel construction being in hand or soon to be undertaken. Manufacturers report a demand from Western cities for Structural Material to be used in new court houses and other public buildings, but the inquiries are usually accompanied by the statement that the payment will be partially or wholly made in county or city bonds, and this almost entirely checks any chance of a

trade; as financial arrangements are not yet in such shape that such bonds can easily be converted into cash. Quotations are maintained at the following prices on mill shipments, Chicago delivery: Beams, 1.75¢ @ 1.90¢; Tees, 1.95¢ @ 2.05¢; Angles and Universal Plates, 1.75¢ @ 1.80¢.

Plates.—Dealers talk much more hopefully. Business with them is picking up nicely both from mill and from store. Some large users of steam power are taking advantage of the present dullness to introduce improvements and make additions, causing a better demand for boilers. The volume of business is by no means up to the average for this time of the year, but it is now in the condition of last June or early July. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.75¢ @ 1.80¢; Shell Steel, 2¢ @ 2.10¢; Flange Steel, 2.15¢ @ 2.30¢; Fire Box, 2.75¢ @ 5¢. Store prices now prevail as follows: Iron or Steel Sheets, Nos. 10 to 14, 2.25¢ @ 2.40¢; Tank Steel, 2.10¢ @ 2.20¢; Shell Steel, 2.20¢ @ 2.40¢; Flange Steel, 2.50¢ @ 2.65¢; Boiler Tubes, 67½¢.

Sheets.—More business is being done in both Black and Galvanized Sheets. Quite a number of jobbers are buying, and some trade is coming from roofing and corrugating works. This is caused by the refusal of such buyers to place large contracts early in the season and they are now obliged to come in to meet the requirements of their regular trade. Business in Galvanized Iron rarely covers more than single carload orders. Those who usually buy 1000-bundle lots are limiting their purchases to small quantities and ordering more frequently. Mill shipments are quoted at 2.75¢ @ 2.80¢ Chicago, for No. 27 Common Iron and 70 and 10 and 5 % off for Juniata Galvanized. Small lots are selling at 3¢ or less on Common No. 27 Sheets, and 70 % @ 70 and 7½ % for Galvanized Iron. Sheet Copper is moving moderately at 30 % @ 35 % off, according to quantity.

Merchant Steel.—Further contracts were placed for the season last week by manufacturing consumers, but orders for immediate shipment are not plentiful. A large order was placed for Carriage Spring Steel. The season buyers are sending in specifications but slowly, and manufacturers are trying to induce them to change their policy, urging that it will lead to difficulties in making prompt shipments later in the season. Mill shipments, Chicago delivery, are quoted as follows: Smooth-Finished Machinery, Tire and Open Hearth Spring Steel at 1.90¢ @ 2¢; Ordinary Bessemer Machinery, 1.65¢ @ 1.70¢; Ordinary Tool Steel at 6¢ @ 7¢; Specials, 12¢ and upward.

Rails and Track Supplies.—The demand for Steel Rails is limited to a small business in light Rails. Prices are unchanged at \$30 @ \$32 for standard sections; 1.60¢ @ 1.65¢ for Iron and Steel Splice Bars; 2.50¢ @ 2.55¢ for Track Bolts with Hexagon Nuts and 1.85¢ @ 1.90¢ for Spikes.

Old Rails and Car Wheels.—Old Iron Rails are selling at \$14 25 @ \$14 50, but transactions are limited for lack of buyers. Sellers are more plentiful. Old Steel Rails are nominally quoted at \$9 @ \$11, according to length, but no sales are reported. Old Car Wheels are very irregular. Prices depend entirely on the position of the buyer or seller. Offers to sell have

been made on a basis of less than \$13, cash, Chicago, but were refused by consumers.

Scrap.—The last week has been extremely dull in this line. Only a few small sales have come to light. Old Fish Plates have fallen to \$12.75. Nominal selling prices per net ton are as follows: No. 1 Forge, \$10.50; No. 1 Mill, \$8; Sheet Iron, \$5; Pipes and Flues, \$7.75; Axles, \$16; Horseshoes, \$12; Fish Plates, \$12.75; Spikes and Bolts, \$12.50; Cast Borings, \$5.25; Wrought Turnings, \$7.25; Axle Turnings, \$9; Heavy Cast, \$8; Stove Plate, \$8; Malleable Cast, \$8; Mixed Steel, \$9, gross ton; Leaf Steel, \$16.

Metals.—Lake Copper is unchanged, carload lots being still quoted 10½¢. Casting Copper is firm at 9½¢. Spelter is strong and 3.60¢ now seems bottom for prime Western. Pig Lead has receded a little and is now quoted at 3.70¢. Several good sales were made during the past week, but principally for delivery at Eastern points.

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, Pittsburgh, September 26, 1898.

Notwithstanding the fact that money is very much easier, there has not been that improvement in the situation that was hoped for. On the contrary, any change that has occurred during the past week or more has been in the direction of lower prices, with perhaps a slight increase in volume of business. About a month ago, when sellers were afraid to push sales, for fear of not getting their money, it was generally expected that just as soon as money eased up there would be a turn for the better in business, with a gradual recovery in prices. Now that we have an easier money market, which is shown by the fact that banks here have solicited customers for paper within the last week, and have not been favored with the expected improvement in business, the opinion is expressed that there is something else doing the mischief and is responsible for the stagnation now existing in the Iron and Steel trades. The opinion has been expressed by persons exceptionally well informed that the delay of the Senate in coming to a vote on the Silver bill, coupled with the probability of material reductions in the tariff, has brought about the present stagnation in business circles everywhere. Even should changes in the tariff be made it is the impression that business would show at least some improvement just as soon as the extent of these changes became known. It is the uncertainty now existing as to what will be done with the Sherman bill and the tariff that is mainly responsible for the condition of affairs to-day. In regard to prices, it can be stated that events of the last few weeks have shown conclusively that nothing can do as much damage to solvent concerns as competitors whose business is being conducted by receivers. It is claimed that the recent awful slump in prices of Billets and Bessemer Pig has been mainly due to competition of this nature. The desire to realize money by concerns with large stocks of Pig on hand has also had much to do with it. With Bessemer Pig at \$12, Pittsburgh, and Billets at \$18.50, and perhaps less under very favorable conditions, it would seem that the end is certainly in sight, and that prices cannot well go lower without bringing disaster to

those concerns who are marketing their product at these prices, which are certainly below cost of production.

Pig Iron.—When the statement is made that Bessemer Pig has touched \$12, Pittsburgh, with intimations of offers slightly below that figure, and that no business of any consequence is being done, the deplorable condition into which this industry has been plunged can readily be seen, nor is there any prospect of immediate improvement, as it will take considerable time to work up stocks on hand, which at many of the furnaces are very heavy. In the Mahoning and Shenango valleys only four furnaces are running, but large stocks of Iron are piled up at many of the idle stacks. In Gray Forge and Foundry Irons there is little doing, the very low prices failing entirely to stimulate business. Considerable Iron from the Shenango Valley has been sold in this market at prices from \$3 to \$5 per ton under our quotations, but the sales were made for the purpose of realizing cash. We make quotations as follows:

| | | |
|------------------------|-----------|---------------|
| Neutral Gray Forge.... | \$11.50 @ | \$11.75, cash |
| All-Ore Mill..... | 11.50 @ | 11.75 " |
| Bessemer Pig..... | 12.00 @ | 12.10 " |
| No. 1 Foundry..... | 12.75 @ | 13.00 " |
| No. 2 Foundry..... | 11.75 @ | 12.00 " |
| Charcoal Foundry No. 1 | 14.00 @ | 15.00 " |
| Charcoal Foundry No. 2 | 13.00 @ | 14.00 " |

Billets.—The four steel plants in the Pittsburgh district are all making more or less Steel, while at New Castle the Shenango Valley Steel Company have arranged a wage scale with their employees and expect to resume operations on Monday, October 2. In the Wheeling district two or three of the mills are running in part, so that there is considerably more activity, although not a single concern is running to full capacity. Makers here and in the Wheeling district as well are refusing to meet the low prices made by some of their Pittsburgh competitors and prefer to lose the business instead. It is admitted that these prices have been made in order to turn stocks into money, and concerns who have not been reduced to that extremity are refusing to meet them. It is conceded that the best equipped Steel plant in the country cannot sell Steel at \$18.50 and make a profit on it. The market seems to have settled down to \$18.50, at makers' mill, although, as stated above, some concerns have so far refused to meet this price.

Ferromanganese.—In the absence of sales prices have still further declined and we now quote at \$56.50 for domestic. Foreign has been shut out of this market altogether.

Rods.—The increased activity among the Wire and Wire-Nail mills has brought about considerable improvement in Rods, and considerable tonnage has been placed within the last week or so. Reports are going of a sale of 7000 tons made by a Pittsburgh mill to a Western customer. Prices continue low, depending largely on the deliveries and terms of payment.

Finished Material.—In Beams and Channels there is a very fair movement, Pittsburgh having taken considerable Eastern business at low prices. For ordinary lots of Beams up to 15 inch 1.60¢ at makers' mill is still obtained, but for desirable orders this price continues to be shaded. In Plates there is nothing new to report, the volume of business continuing small. Among the Bar mills there seems to be a disposition to secure enough orders to keep running, if naming low prices will do it. As a result of this policy there has

been a material leveling all around and we have reduced quotations to some extent. A conference is being held this (Tuesday) afternoon between a few manufacturers and a committee of the Amalgamated Association at which it is understood the men will agree to accept a straight cut of 10% in the finishing departments if guaranteed that the idle mills will start up. Up to this writing no conclusion has been reached. We quote Angles and Universal Plates, 1.60¢ @ 1.65¢; Tees, 1.65¢ @ 1.70¢; Z-Bars, 1.70¢ @ 1.80¢; Tank, 1.60¢; Shell, 1.65¢ @ 1.75¢; Flange, 1.80¢ @ 1.90¢; Ordinary Fire Box, 2.25¢ @ 2.50¢; Special, 3¢ @ 4¢; Machinery Straightened Tire Steel, 1.80¢ @ 1.85¢; Toe Calk, 2.05¢ @ 2.10¢; Hammer Lay Steel, 2.90¢ @ 3¢; Open Hearth Spring, 2¢; Sleigh Shoe, 1.80¢; Bessemer Machinery, 1.80¢; Steel Bars, 1.85¢ at mill, with Bar Iron extras. Bars in the Mahoning Valley are held at 1.35¢ @ 1.40¢; half extras, at mill. No. 24 Soft Steel Sheets, 2.45¢; No. 26, 2.60¢; and No. 27, 2.70¢. Galvanized Sheets we quote at 70 and 10% in carload lots and 70 and 7½% in small quantities.

Muck Bars.—With Soft Steel Billets selling at about \$18.50 at buyers' mill Muck Bars have been crowded to the rear and there is nothing doing. We make nominal quotation of \$21 at buyers' mill.

Barb Wire.—There is a fair movement, the demand showing considerable improvement over that of one month ago. Prices are without change, and we continue to quote Four-Point Galvanized at \$2.40 in carloads, and 40¢ less for Painted. Plain Wire is in fair demand at \$1.60 @ \$1.65 in carload lots at mill for Nos. 6 to 9, with the usual advances for the other sizes.

Wire Nails.—There is a fair amount of business going in small lots, and it is understood that negotiations are on for several large lots, which are expected to be closed up within a week or two. Some extraordinary records for production have recently been made at the Beaver Falls Mills. In one day recently on a run of 22½ hours there were 3199½ kegs turned out on 141 single-header machines. This is claimed to beat the best previous record for production. We quote at \$1.40, in carload lots at mill.

Coke.—For the week ending September 16 there were 4343 ovens in the Connellsville region in blast and 13,047 idle, with a total estimated production for the week of 38,390 tons. We continue to quote Furnace Coke at \$1.20 in tons of 2000 lb, f.o.b cars in Connellsville region. Foundry Coke we quote at \$1.50 to dealers and \$1.65 to consumers.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts., Cincinnati, September 27, 1898.

The demand for Pig Iron during the week ending to-day has been small, even for a dull season, and was conspicuously curtailed because the two previous weeks had been marked by much activity, and although low prices prevailed it was welcomed by the trade as the beginning of better things. But this hope has now been dashed to the ground, for the dilatory action of the Senate evidently holds the manufacturing as well as the financial interests of the country in check. There was a sale of 1000 tons, which was the largest of

the week, and there was scored another in this district for more than a carload. Even the run of Eastern orders was light, and while there does not appear to be any urgency to sell, it is apparent that Iron can yet be bought as low as ever. Gray Forge Iron, which had previously been sold at \$7, f.o.b. Birmingham, seemed to be recuperating, and we did not make the quotation here on so low a basis, but now it is squarely down to that. There is little Charcoal Iron selling, but the jobbing sales of small lots include nearly all kinds. For the time being the aspect of the market is discouraging. Quotations as follows:

Foundry.

| | |
|---------------------------------|-------------------|
| Southern Coke, No. 1..... | \$12.75 @ \$13.00 |
| Southern Coke No. 2..... | 10.75 @ 11.00 |
| Southern Coke No. 3..... | 10.25 @ 10.50 |
| Ohio Soft Stone Coal, No. 1.... | 15.50 @ 16.00 |
| Ohio Soft Stone Coal, No. 2.... | 14.50 @ 14.75 |
| Lake Superior Coke No. 1..... | 15.00 @ 15.25 |
| Lake Superior Coke No. 2..... | 14.00 @ 14.25 |
| Hanging Rock Charcoal, No. 1.. | 18.50 @ 19.00 |
| Hanging Rock Charcoal, No. 2.. | 17.50 @ 18.00 |
| Tennessee Charcoal, No. 1..... | 14.00 @ 14.25 |
| Tennessee Charcoal, No. 2..... | 13.00 @ 13.25 |

Forge.

| | |
|-------------------|--------------|
| Gray Forge..... | 9.75 @ 10.00 |
| Mottled Coke..... | 9.50 @ 9.75 |

Car Wheel and Malleable Irons.

| | |
|--|---------------|
| Standard Southern Car Wheel | 17.75 @ 18.00 |
| Lake Superior Car Wheel and Malleable..... | 17.00 @ 17.25 |

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., September 28, 1893.

There is but little change to note in the condition of the Iron market; some people think there is no change at all, others say there is rather more business and a better inquiry, as though there might be a more active demand in the near future. Taking it all around no one seems to have added much to the amount of work on hand, neither is there any claim to better prices, so that the situation is practically unchanged. The only order of any amount was that of some 3000 to 3500 tons Structural Material, taken for the Bourse Building by the Edge Moor Iron Company, the material for which will doubtless be furnished by the Carnegie Steel Co. No official announcement has been made in regard to the matter, neither do the parties interested admit that the contract is closed; but from personal knowledge we feel safe in saying that the material will be furnished by the Carnegie Steel Co., and the work of fitting, &c., will be done by the Edge Moor Iron Company. As a matter of fact, and as a matter of business also, we may further state that the work was taken at \$5 @ \$6 per ton less than was named by any of the other competitors. This is no reflection on the successful bidders, as their facilities are known to be of the very best, but it shows that when big concerns are determined to take the business, a matter of \$2 or \$3 per ton will not stand in their way.

Pig Iron.—The demand is of a very languid character, and although production is understood to be less than half of what it was six months ago, there is still more than enough to supply the demand. There is no particular pressure on standard brands, but once in a while outside lots are offered at prices below anything heretofore mentioned. The circumstances are exceptional, however, so that they do not seriously affect the market, although they are sometimes a disturbing element, besides showing that some holders are anxious to unload and get their money. Never-

theless there is a general conviction that good Iron at present prices will prove to be a first-class investment some of these days, but the trouble is that nobody seems to be looking for investments just now. The tendency is to carry as little stock as possible, and so long as consumers prefer having their money in bank, rather than in material at bargain prices, it will take time to develop an advance. There will be a change some day. First class Mill Iron at \$12 @ \$12.50 per ton and Foundry grades at \$13.50 @ \$14.50 will not continue forever, and the fact that production is less than half what it was earlier in the year gives additional force to this suggestion. Meanwhile only small lots are taken and usually at prices about as follows for Philadelphia and equivalent points: \$12.50 @ \$13. delivered, for Gray Forge or Plain No. 2, \$13.75 @ \$14.25 for No. 2x and \$14.50 @ \$14.75 for No. 1x.

Steel Billets—Business in this line is very quiet, and prices are again pretty well down to the lowest. An attempt was made to secure an advance of about 50¢ per ton, but consumers made no response, so that makers are again asking for bids of \$21.25, delivered. One or two small lots were taken at \$21.50 @ \$21.75, but those who can handle 500 to 1000 ton lots and upward, taking prompt deliveries and making equally prompt settlements, would have no difficulty in placing orders at \$21, with a possibility of doing still better for spot cash. Sellers want business, and to the right parties are willing to offer special inducements. Consumption is not large, however, hence the light demand.

Finished Material.—There is a fairly good demand for small lots, and mills catering to that class of trade manage to run a full force on single turn. The large trade is very dull, however, and mills whose main dependence is on heavy contracts are doing very little, as there is nothing new coming out, while a good deal of old work is "hung up" for financial or other reasons. What business has been on the market recently of 100 to 200 tons and upward has been taken by Pittsburgh at from \$2 to \$4 or \$5 below what local mills would quote. The feeling is that if they want work at such prices as mentioned they can take all they can get, as it is not considered worth bidding for, particularly as it is mostly for very long delivery. There is nothing in the immediate outlook to warrant expectations of improvement, so that business is readily placed at about the following prices, and sometimes at less when the order is considered strictly gilt edged:

| | |
|-------------------------------|---------------|
| Grooved Skelp, delivered..... | 1.50¢ @ 1.55¢ |
| Best Refined Bars..... | 1.55¢ @ 1.60¢ |
| At interior points..... | 1.50¢ @ 1.55¢ |
| Tank Steel..... | 1.65¢ @ 1.70¢ |
| Heavy Plates..... | 1.70¢ @ 1.75¢ |
| Shell..... | 1.80¢ @ 1.90¢ |
| Flange..... | 2.00¢ @ 2.20¢ |

Old Material.—Demand very slow, and prices weak and irregular. Asking prices are about as follows (delivered), although for spot cash concessions of 50¢ per ton and upward can frequently be secured:

| | |
|-------------------------------------|-------------------|
| No. 1 Wrought Scrap, delivered..... | \$12.50 @ \$13.50 |
| Machinery Cast, delivered..... | 10.50 @ 11.00 |
| Heavy Steel Scrap, delivered..... | 13.00 @ 14.00 |
| Old Iron Rails, delivered..... | 15.00 @ 16.00 |
| Old Street Rails, delivered..... | 17.00 @ 18.00 |
| Wrought Turnings, delivered..... | 10.00 @ 11.00 |
| Cast Borings, delivered..... | 6.50 @ 7.00 |
| No. 2 Light Scrap, new.... | 8.00 @ 8.50 |
| No. 2 Light Scrap, old.... | 6.00 @ 7.00 |

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, September 27, 1893.

Pig Iron.—The demand during the past week has been fair and sales for the entire week would aggregate perhaps 2500 tons. Prices are well maintained as quoted below. There is no anxiety on the part of consumers to secure Iron, and they evidently believe that Iron will be as cheap during the balance of the year as it is to-day, and that a hand-to-mouth policy is the proper course to adopt. There is no snap to the market, and business is only done after days of dickering. Consumption does not improve and many manufacturing establishments continue to work only half time. We quote as follows for cash, f.o.b. cars St. Louis:

| | |
|---------------------------------------|-------------------|
| Southern Coke, No. 1 Foundry..... | \$12.25 @ \$13.50 |
| Southern Coke, No. 2 Foundry..... | 11.75 @ 12.00 |
| Southern Coke, No. 3 Foundry..... | 11.25 @ 11.50 |
| Southern Gray Forge..... | 10.50 @ 10.75 |
| Southern Car Wheel..... | 17.50 @ 18.00 |
| Lake Superior Car Wheel..... | 16.75 @ 17.25 |
| Ohio Softeners..... | 16.00 @ 16.50 |
| Missouri Charcoal, No. 1 Foundry..... | 13.00 @ 13.50 |

Bar Iron.—Trade continues to be fairly satisfactory, although there are no large sales reported. Car works are not running full by any means, and railroads are not using their usual complement of material. Jobbers quote 1.70¢ @ 1.75¢ for lots from store. Mills ask 1.50¢, half extras, f.o.b. cars East St. Louis.

Barb Wire.—A steady flow of orders is reported without any change in prices. Mills are running short of stock and are making preparations to run full instead of half time. Painted is quoted at \$2 in carload lots to jobbers. Galvanized at 40¢ per cwt additional. Jobbers ask \$2.10 @ \$2.15 for small lots of Painted from store.

Wire Nails.—A firmer tone pervades the Wire-Nail market. The demand continues to improve and as stocks of Nails are unusually light a slight advance in prices would be in order. Mills quote \$1.55 for carload lots to jobbers. Small lots from store command \$1.65.

Rails and Track Supplies.—There is nothing doing in Rails, which are nominally quoted at \$30 @ \$31. Track Supplies are absolutely lifeless and are quoted as follows: Splice Bars, 1.65¢ @ 1.70¢; Spikes, 1.90¢ @ 1.95¢; Bolts, Square Nuts, 2.50¢; with Hexagon Nuts, 2.60¢. Old Iron Rails are unchanged at \$15.

Pig Lead.—There is practically nothing doing in Lead. The market is heavy at 3.10¢, and in the absence of any demand the price above quoted is nominal.

Spelter.—This metal is unchanged at 3.45¢ @ 3.50¢. A good firm offer would doubtless secure Spelter at 3.40¢, but there is no consumptive demand whatever.

The oldest engineering society in existence is believed to be the Smeatonian, founded in the last century by Smeaton, one of the pioneer engineers of England. It is still carried on, and was represented in the recent Engineering Congress in Chicago by Sir Benjamin Baker.

Financial.

The developments in the financial situation during the past week give decided indications of the unfavorable effect produced by the persistent delay in Senatorial action on the silver-purchase repeal bill. A feeling of insecurity, born of uncertainty as to the outcome of present currency legislation, has caused a marked reaction from the buoyancy of a few weeks ago. Last week saw an almost stagnant stock market, with declining prices, which latter feature was further emphasized at the commencement of the current week, although a slight revival occurred on Monday. The whole tone of the market for securities has, however, been weak and feverish, and the feeling of uneasiness has been further increased by large sales of American securities by Europe, showing that foreign investors are beginning to lose confidence in the prospects of immediate and unconditional repeal of the silver law. According to leading financial authorities, nothing but this will restore confidence in Europe and keep European funds in this country. The feeling among investors in London is expressed in the following advice given to its readers last week by the *Saturday Review*:

"Some of our readers ask us to be a little more explicit in our advice to investors. We would remind them that, although there has undoubtedly been a considerable improvement in the United States, there are still dangers ahead. Especially, the Senate has not repealed the Sherman act, and, though everybody believes that it will do so, yet it is often the unexpected which happens. Assuming, however, that the Sherman act is repealed, the worst dangers we may hope are over, and, therefore, investors may begin to buy, if they act with caution and judgment." Should the repeal be much longer delayed, however, it is certain that a great deal more of the foreign capital still remaining in the United States will be withdrawn, and much now awaiting investment will be withheld or diverted to other sources.

The sterling market has made rapid progress toward rates at which shipments of gold would be necessary to cover the drawings of foreign bankers; and it is not unlikely that renewed exports of the yellow metal may take place next week, if not earlier, should no more encouraging news from Washington arrive in the meantime. At present bankers here are pursuing a very cautious policy, and meanwhile the whole banking and mercantile community is awaiting with manifest impatience the termination of the dilatory proceedings at Washington.

That the delay is having a discouraging effect upon general business is proved by the recent statements of bank clearings—a very reliable barometer. These for the whole country footed up last week \$776,854,556, against \$801,714,895 for the previous week, and \$1,115,884,012 for the corresponding week in last year. This means that last week's business was smaller by \$339,029,456 than that of the corresponding week of last year, and less by nearly \$25,000,000 than that of a week ago.

The weekly statement of the Associated Banks on Saturday was what is termed "favorable;" that is to say, there was shown to be a gain in cash and specie for the week, which brings the surplus up to \$17,609,950 in excess of legal requirements. Seven weeks ago the banks reported a deficit in legal

reserve of \$16,500,000. In the same time their loans have decreased by \$19,000,000, and their deposits increased \$13,000,000. These figures tend to show that notwithstanding the ample funds held by the banks, the very fact that they are rolling up such a plethora of money is evidence of stagnation in business and speculation. Money is plentiful, so far as bank reserves go, and loans are easily obtainable where the money can be called in again at a few hours' notice, but the market for long-time loans is again very restricted, consequently but little forward business can be planned or undertaken by merchants or manufacturers, and this involves a considerable curtailment in general trade.

The retirement of Clearing House loan certificates by New York banks has been active during the week under review, the Loan Committee having canceled \$5,025,000 worth since last Thursday, leaving the amount now outstanding at \$27,655,000. For Thursday \$1,250,000 additional are called. Cancellations at Boston have reduced the amount of Clearing House loan certificates outstanding in that center to \$5,100,000.

Call loans are very easy at 2% @ 3%, closing on Wednesday at about 3%. Renewals usually at 3% @ 3½%. The supply of money offered in this way is large, and the demand comparatively light. Time loans are not being so freely offered, and the rates have again stiffened; 6% is quoted nominally, but a commission is usually exacted unless the securities offered are exceptionally good. Some little business has been done in commercial paper, but exclusively with out of town institutions. The supply of paper is good, and rates are quoted at 7½% @ 8% for good double-named, and 8% @ 12% for other descriptions of paper, but the fear of gold exports has prevented New York banks from buying.

On Thursday last the market for sterling exchange became very strong and active, rising nearly 2½¢. This is attributed to the reason that bankers and others who made loans on the other side during the stringency here have become nervous and are calling them in as they mature. On Wednesday the rates advanced ½¢, being quoted, for actual business, at: 60 days, 4.84½ @ 4.85½; demand, 4.86½ @ 4.87; cables, 4.87½ @ 4.88½; commercial, 4.84. Cotton bills are in good supply, but commercial bills are not yet offered in sufficient quantity to ease rates to any extent and there is still a prospect of approaching exports of gold. Domestic exchange on New York is quoted as follows: Boston—17¢ discount for cash; checks, even. Charleston—Buying, ½ discount; selling, ½ discount to par. Savannah—Buying, ½ discount; selling at ½ discount to par. New Orleans—Bank, \$3 premium; commercial, 50¢ premium. San Francisco—Sight, 20; telegraphic, 30. St. Louis—75¢ premium bid. Chicago—80¢ premium.

The Stock Exchange has felt the effects of the obstruction placed in the way of action on the repeal bill in a dull market for securities, which at the end of last week approached absolute stagnation. On Monday the lowest prices that have ruled for some weeks were quoted. Tuesday, however, saw a revival of the market to a degree of activity unknown for nearly a month, caused by large local selling orders, apparently induced by fear of gold exports. Prices tumbled again, but rallied on some stocks toward the close.

The quotations all along the line show, however, a marked decline from those of last week, as will be seen in the following list of fluctuations in some of the active stocks since Thursday, September 20:

| | High- est. | Low- est. | Closing, Sept. 27. |
|-----------------------------------|---------------|--------------|-----------------------|
| Am. Sugar Ref..... | 87½ | 84½ | 85½ |
| Atchison, T. & S. Fé..... | 20½ | 18½ | 18½ |
| Balt. & Ohio..... | 71 | 66 | 66½ |
| Chicago Gas..... | 6½ | 52½ | 58½ |
| Chic., B. & Q..... | 84½ | 79 | 79½ |
| Chic., Mil. & St. Paul..... | 61½ | 58½ | 59½ |
| Chic., Rock Isl. & Pac..... | 66 | 61½ | 62½ |
| Del., Lack & Western..... | 144½ | 140½ | 144½ |
| Gen. Electric..... | 48½ | 39½ | 41½ |
| Lake Shore..... | 122 | 117½ | 118 |
| Louisville & Nashville..... | 56½ | 51½ | 50½ |
| Manhattan..... | 129½ | 120 | 123½ |
| Missouri Pacific..... | 26½ | 23½ | 22 |
| Minnesota Iron, asked..... | | | 60 |
| National Lead, Common..... | 29½ | 24½ | 25 |
| New York Central..... | 103½ | 101½ | 100½ |
| N. Y., L. E. & Western..... | 15½ | 12½ | 12½ |
| Northern Pacific, Pfd..... | 24 | 18½ | 19½ |
| Philadelphia & Reading..... | 19½ | 16 | 14½ |
| Richmond & West Pt., Term..... | 3½ | 3½ | 3½ |
| St. Paul & Omaha..... | 35½ | 32 | 32 |
| Union Pacific..... | 22½ | 19½ | 20 |
| Western Union..... | 82½ | 78 | 78½ |

Government bonds have been quiet and steady at unchanged quotations, the last sales at the board being reported as \$1000 4s registered at 110 and \$500 coupon 4s at 111. Railway and miscellaneous bonds are weak, with a downward tendency in prices and a falling off in business done.

Bar silver has declined slightly in price, the last London quotation being 34½ pence per ounce, and in New York it closed at 73½¢ per ounce. The Treasury Department on Tuesday bought 196,000 ounces of silver at 74½¢ per ounce.

Metal Market.

Copper.—The market is looking a little ragged. Semi-official data show that production is well up to the average. It is also a matter of record that exports latterly have been quite heavy, or considerably above the average for the first half of the year; but the significant fact remains that shipments of old French Syndicate Matte were conspicuous in the late movement, and there is no lack of evidence that current production suffices to make good the drafts upon old surplus. In any event the general report would warrant the statement that supply is running ahead of the demand, since sales at last week's prices have been difficult to make at prices that looked low at the close of last week's report. Close market prices just now are about 9½¢ @ 9½¢ for Lake Superior Ingot; 9½¢ @ 9½¢ for Electrolytic; and 9½¢ for Common Casting brands, in wholesale quantities, for delivery during the balance of the year. Nothing more than strictly routine business on home account has been effected during the past week, and the demand at present is tame.

Pig Tin.—The leading operators have continued to mark prices higher and on Tuesday succeeded in carrying the net cash rate for round lots up to 21¢ per lb, making an advance of about ½¢ for the week, and, besides, narrowing the margin of difference between prices for deliveries for various options during the balance of the year to a very fine point. Some dealers who stocked up when prices were much lower have unloaded, in part at least, but there has been no sign of "short" selling, and the surface indications are that the statistical position has improved, since sales to interior dealers and consumers have been quite up to the average for the season. It is estimated that at least 450 tons have changed hands on the advance,

nearly all for delivery during the next two or three weeks, and that the supply in first hands is now down to about four months' consumption, with the greater portion controlled by a few firms. On Wednesday one block of 165 tons, spot delivery, was taken by the leading holder at 20.75¢. Subsequently 10 tons went at 20.95¢, and the latter price was bid on the Metal Exchange "call."

Pig Lead.—The official Bullion price has been lowered to 3.65¢. Further than that there is no change, although the market has remained very quiet. There are buyers now at 3.75¢, regular, and sellers at 3.80¢ are comparatively few. Most holders ask 3.85¢ upward. In other words, the market is a "waiting" one and extremely uncertain for the time being, as well as unmistakably quiet in this quarter. There is no speculation worthy of the name and dealers and consumers operate with extreme caution.

Spelter.—Hardly enough business has been done in this quarter to afford a fair idea of the status of the market for ordinary domestic brands. The offering is moderate, however, and the negotiation would indicate that surplus supplies have been cut down considerably since the recent curtailment of production. In any event the offering is smaller, and ordinary brands do not appear to be available at less than 3.80¢ landed here for delivery during the balance of the year.

Antimony.—The market has been quiet, but prices remain quite steady. We quote at 9½¢ @ 9¼¢ for Hallett's, 10¢ @ 10½¢ for L. X., and 10½¢ @ 10¼¢ for Cookson's, in round lots.

Tin Plates.—Ordinary Cokes have continued in good demand for prompt delivery and prices for the same show further improvement. Other Plates remain quiet and merely hold their own in price. Future deliveries meet with slow and irregular sale. The moderate business passing is chiefly at about former prices. Spot quotations are as follows: Coke Tins—Penlan grade, IC, 14 x 20, \$5.20; J. B. grade, do., \$5.37½; Bessemer full weight, \$5.35; light weights, \$4.95 for 100 lb, \$4.90 for 95 lb, \$4.75 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60; Siemens Steel, IC basis, \$5.65; IX basis, \$6.75 @ \$7. Charcoals—Melyn grade, IC, \$6.35 @ \$6.37½; Crosses, \$8; Allaway grade, IC, \$5.60; Crosses, \$6.75; Grange grade, IC, \$5.75; Crosses, \$6.85. Charcoal Terns—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.50; do., 20 x 28, \$15; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.15; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.32½ @ \$5.35; do., 20 x 28, \$10.40; Wasters—S. T. P. grade, 14 x 20, \$4.75; do., 20 x 28, \$8.90; Abercarne grade, 14 x 20, \$4.60; do., 20 x 28, \$8.80.

New York.

Office of *The Iron Age*, 95-102 Reade street, New York, September 27, 1893.

Pig Iron.—The lot of 1500 tons of Warrant Charcoal Iron has been withdrawn from auction, and at the present time none of the bankers' holdings seem to be pressing. There are some indications, however, that merchants are selling at very low prices, in tributary markets, Pig Iron on which they had made advances. Reports of low offerings continue to be made in different quarters, and the market continues irregular and decidedly in buyers' favor.

Makers of standard Irons report a moderate current business and a satisfactory rate of shipments, considering the light production. We quote Northern brands \$14 @ \$15 for No. 1; \$13 @ \$14.25 for No. 2; \$12.25 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13.25 @ \$14.25 for No. 1; \$12.25 @ \$13.25 for No. 2; \$11.50 @ \$12.25 for No. 3; \$11.75 @ \$12.25 for No. 2 Soft, and \$12.25 @ \$12.50 for No. 1 Soft. Gray Forge is \$11.25 @ \$12.

Ferromanganese and Spiegeleisen.—There is no business to report.

Billets and Rods.—Low offerings of domestic Billets are demoralizing the market. Domestic prices have reached a point where it will pay only in a very few instances to import foreign Billets for the export Wire trade. We quote nominally: Domestic Billets, \$21.25 @ \$23, and foreign Billets, \$28 @ \$28.50, tidewater; domestic Wire Rods, \$29.75 @ \$31, and foreign Rods, \$39.50 @ \$40.

Steel Rails.—Rumors of the cutting of prices by a Western mill are current. They seem to be based on the sale of a 1000 ton lot for delivery in Texas at \$32, delivered, which would be far below the tidewater price which has been universally maintained for so long a time. It is stated, however, that it was a resale of a lot of Rails which an Alabama road failed to take and pay for. There has been virtually no market for so long a time that it is quite impossible to state at what figures a good contract would be accepted. We note sales of Old Steel Rails fit to relay aggregating 1500 tons at \$18, with offerings now at even lower figures.

Track Material.—Small lots are selling at the following prices: Spikes, 1.80¢ @ 1.90¢; Fish Plates, 1.45¢ @ 1.60¢; Track Bolts, Square Nuts, 2.25¢ @ 2.40¢, and Hexagon Nuts, 2.40¢ @ 2.50¢, delivered. Concessions would be made for round lots.

Manufactured Iron and Steel.—Business is very dull, and the outlook for the future is growing gloomier. Instead of accumulating orders, as they should do at this time of the year, the mills have not enough work to run at even a moderate rate. Western competition is very severe. We quote: Beams up to 15 inch, 1.75¢ @ 2¢; 20-inch, 2.10¢ @ 2.25¢, for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.70¢ @ 1.90¢; Tees, 2¢ @ 2.15¢; Channels, 1.80¢ @ 2¢, on dock. Steel Plates are 1.65¢ @ 1.90¢ for Tank; 1.90¢ @ 2.10¢ for Shell; 2¢ @ 2.15¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.55¢ @ 1.9¢, on dock, and Common, 1.45¢ @ 1.55¢; Soft Steel Bars are 1.50¢ @ 1.70¢; Scrap Axles are quotable at 1.75¢ @ 2.10¢, delivered; Steel Axles, 1.70¢ @ 2¢, and Links and Pins, 1.70¢ @ 1.80¢; Steel Hoops, 1.75¢ @ 1.90¢, delivered; Cotton Ties, 70¢ @ 72½¢ @ 45 lb bundle, at mill.

Old Material.—Old Material continues practically unsalable. Some of the roads tributary to this market have been offering stock all summer at gradually lower prices and still have been unable to dispose of it. There are a number of round lots of Old Steel Rails in the market at \$8 @ \$9. A lot of 500 tons of Old Iron Rails was offered at \$12.50 this week, but found no buyer. This is by far the lowest price on record for this class of material. Wrought Scrap is offered at \$9 for No. 1 and we have the extraordinary spectacle of Wrought Scrap being as low in price as good Cast Scrap.

British Iron and Metal Markets.

[Special Cable Dispatch to *The Iron Age*.]

LONDON, WEDNESDAY, September 27, 1893.

In the price of Straits Tin there has been a decline of fully £1, or to £79/5, for prompts, and the market has shown weak tone in the face of strong advices from America. Reports of prospective smaller Straits shipments brought more speculative demand early in the week, but subsequent realizations, in which dealers and importers were interested, forced prices lower in the face of indications that cash metal is either scarce or closely controlled. At the close the market was feverish, with Straits quoted at £79. 7/6 for prompt and £79. 15/ for future delivery.

Copper has ruled lower, and final prices show about 15/ decline, as compared with those that ruled a week ago. The heavy shipments from America have neutralized late reports of stronger tone there and selling orders from operators there have also had more favorable influence. Warrants are not offered freely, but buyers are cautious in view of the unfavorable general situation. Last business in Merchant Bars was at £41. 17/6 for prompts and £42. 5/ for three months' futures. Best selected English was quoted at \$46. 15/.

In the market for Tin Plate there is a somewhat better feeling, but prices have undergone no radical change. The improvement has been chiefly in Oil sizes, for which several orders have been placed. A number of mills that were recently shut down because of miners' strikes have been restarted, and stocks at present are liberal. Liverpool quotations are as follows:

| | |
|-------------------------------------|-------------|
| IC Charcoal, Alloway grade..... | 12/9 @ 13/8 |
| IC Bessemer Steel, Coke finish..... | 11/6 @ 11/9 |
| IC Siemens..... | 11/9 @ 12/ |
| IC Coke, B. V. grade, 14 x 20..... | 11/6 @ 11/9 |
| Charcoal Terne, Dean grade..... | @ 11/6 |

Pig Lead has met with slow sale and the market is merely steady at £9. 15/ for soft Spanish.

Spelter sells slowly and the market is flat at £17. 2/6 for ordinary Silesian. Supplies are quite large.

In all branches of the Iron and Steel trade business has been moderate. Pig-Iron prices barely hold their own. Steel Rails have reacted to £3. 15/-. Last dealings in warrants were at 42/3 @ 44/4 for Scotch, 35/1½ for Cleveland, and 45/1½ for Hematite.

Trade Publications.

THE Q & C COMPANY, Western Union Building, Chicago, have issued a 16 page pamphlet calling attention to the specialties they manufacture. These are the Servis tie plate, the Q & C trolley-car door, the Dunham freight-car door, the improved Globe ventilator for cars, the Keystone car replacer, the Bryant metal-sawing machine and the Q and C cattle guard. The company's offices are now in the hands of a receiver, Edward W. Eldridge, but he

has full authority from the court of jurisdiction to continue buying, selling and manufacturing, so that the business of the company continues without interruption.

THE DODGE MFG. COMPANY of Mishawaka, Ind., issue a souvenir of the World's Fair, in which they describe the power transmission by manila rope at their works, and also the wood pulleys, hangers, pillow blocks, shafting, friction clutches and couplings, &c., made by them. They mention that the fly wheel of the engine was designed and built by them. Its dimensions are 22 feet diameter, 25 inches face, weight 27,000 pounds. The hub, arms and a portion of the rim are iron, the surface of the rim being of wood, and is grooved for ropes. This wheel was put on the shaft after the shaft was in place, and turned up, has been running five years doing 500-horse power, and is in as good condition as when first started. The rope drive from this wheel to the jack shaft has proved most successful. The original rope is still doing service, and without any delay to machinery, and to all appearance will run five years longer without renewal. It is stated that "from a careful estimate of the comparative cost for belt pulleys, versus rope and grooved wheels, this rope could be renewed every eight months and still be inside of cost and maintenance of belt."

THE BUCYRUS STEAM SHOVEL & DREDGE COMPANY of South Milwaukee, Wis., send out two very complete catalogues illustrating and describing their dredging and excavating machinery. The perspective views presented are from photographs of the machines in actual operation and show their wide and varied application. The construction of the several machines is further made plain by the use of outline drawings.

WE HAVE RECEIVED from the Locke Regulator Company of Salem, Mass., an elaborate catalogue descriptive of the pump governors, damper regulators, pressure regulators, steam traps, valves, &c., made by them. By means of very clear engravings and ample text, the construction and operation of these steam appliances are plainly brought out.

THE COUNTING MACHINES made by W. N. Durant of Milwaukee, Wis., are described in a neat catalogue just received. These counters are applicable to any machine of which it is desired to count the strokes or revolutions. The electric counter can be placed at any desired distance from the machine whose work it is to register. The numerous testimonials printed in the pamphlet show the varied applications of these counters and their successful operation.

Lake Superior News.

The hardest blow the Gogebic range in Michigan and Wisconsin has known for a long time was the closing of the great Norrie Mine last week. The Norrie has been the largest iron-ore producer in America for a year or two, mining and shipping last year close to 1,000,000 tons. It has always sold chiefly to the Carnegie interests about Pittsburgh, and to the Illinois Steel Company. The latter have taken very little ore this year, and that little largely from the Minnesota Iron Company's mines in this county. The close down is indefinite and throws 300 men out of employment, most of the mine's ordinary force of 1500 men having been discharged months ago. The mine has shipped to date this year 275,000 tons, and has over 150,000 tons still in stock pile, which is to be steadily shipped. Its entire output for the year will be about 45 per cent. of that of 1892.

The closing of this mine reduces the wage-earning force in the town of Ironwood to about 600, 200 being employed on public work in the town and the rest at some mines still operating.

In spite of the renewal of work at Lake Angeline Mine and the constant

outflow of the unemployed foreigners to their old homes across the Atlantic, there are fully 1500 idle men in Ishpeming waiting for something to turn up. This situation, here and at other Upper Peninsula mining towns, has much to do with the distorted and unfavorable reports sent out from them on the new Mesaba range.

Iron-ore shipments from the western end of Lake Superior were as follows the past week: Ashland, Gogebic range, 37,154 tons; Duluth, Vermillion range, 21,837 tons; Duluth, Mesaba range, 28,000 tons. Total shipments for the season to date are: Ashland, 930,000 tons; Vermillion range, 652,000 tons; Mesaba range, 240,000 tons.

The Mountain Iron Mine of the new Mesaba syndicate has issued orders that none but men who speak English shall be employed. The policy of the new combination is understood to be the employment of Americans exclusively, so far as possible. As this range will be the great labor employer of the Lake Superior districts its action in this respect is of considerable importance, and foreshadows the retirement of the turbulent and anarchistic element that has had practical control in many of the mines.

The ore business of the Duluth, Missabe & Northern road is now greater than it has ore car facilities for, and ordinary flat cars are being used in ore traffic. These are found to be well adapted for the soft ores of this range, the loads being handled as is gravel, by plows drawn by cable attached to a locomotive.

Most favorable reports are coming from the furnaces using Mesaba ores. It has been the argument of many iron men that over 10 per cent. of Mesaba ore could not be used in furnaces because of its fineness. The Girard Iron Company of Ohio are mining 80 per cent. of Mesabi Biwabik and getting 17 tons per day more pig iron, with the same fuel, than with their old mixtures.

The New Western Scale.

(By Telegraph.)

At a meeting held in Pittsburgh yesterday by the Conference Committee of the Amalgamated Association and a few of the Pittsburgh manufacturers material reductions in the finishing departments of the wage scale were granted, and the prospect of a number of mills now idle resuming operations in the near future is considerably brighter. Taking the Amalgamated Association wage scale as it appeared in *The Iron Age* of July 27 last no change was made in the boiling scale. It is likely, however, that another conference will be held at an early date to consider the question of a reduction in boiling, since Pittsburgh manufacturers cannot compete with non-union mills, in some of which boiling is being done as low as \$4 per ton. In scrap-ping and busheling nothing was done, but a conference will be held later on, when it is likely a reduction in these departments will also be granted. The same applies to knobbling. In the finishing departments of the scale the base has been changed from 2¢ to 1.50¢

right throughout the list. In heating slabs and shingling a straight reduction of 10 per cent. has been allowed, and for each advance of $\frac{1}{16}$ ¢ in bars wages will be advanced a little more than 2 per cent. In bar and nail-plate mills a straight reduction of 10 per cent. was granted. Clause 7 in the foot notes, with paragraphs below it, was entirely stricken out. In 9-inch, 10-inch, hoop and cotton-tie mills a reduction of 10 per cent. was granted except for those sizes on which 10 per cent. reduction was granted at the conference in July. On these sizes no change was made. On sizes where 5 per cent. reduction was allowed in July an additional 5 per cent. has been granted. This applies right through the list of the above mills. No change was made in the foot notes. In the special scale for 10-inch and smaller mills working 2½ inch and narrower, No. 10 and lighter hoop exclusively, a reduction of 10 per cent. was granted with the exception of those sizes where reductions were granted in July, and these remain unchanged. In plate and tank mills a straight cut of 10 per cent. was granted right through the list and foot note No. 9 was stricken out. A 10 per cent. reduction for rolling pipe iron on sheet and jobbing mills was allowed. No changes were made in the sheet mill scale whatever. In mills rolling muck bar and finished iron for sheet iron 10 per cent. was to be deducted from all finished iron for clippings, but an additional 7 per cent., or 17 per cent. in all, was granted. In structural mills a straight 10 per cent. reduction was allowed; foot notes 1 and 2, applying to mills of large tonnage, remain unchanged. For rolling on continuous trains 10 per cent. was allowed. In wire rod mills no change was made, manufacturers being granted a 10 per cent. reduction some time since. The journeymen roll turners' scale was not taken up, but this will be considered at an early date, when it is probable that a reduction will be granted to the manufacturers. As soon as it can be done a new wage scale will be prepared by the Amalgamated Association containing the above changes and will be sent to such mills as are now idle, with the expectation that it will be signed and operations resumed. The fact, however, that no action was taken regarding the boiling scale will probably delay operations being resumed in some of the mills, as a number of manufacturers have strongly expressed themselves to the effect that they cannot pay \$5 for boiling and compete with non-union mills, in which the price is considerably less.

While it is true that the works of the Cambria Iron Company, at Johnstown, are idle, we are advised officially that the stoppage is only temporary and that work will be resumed in part next week.

HARDWARE.

Condition of Trade.

THE MARKET SHOWS but little change since our last review. The demand continues moderate and is perhaps not quite so heavy as a week or two ago. The trade are limiting their orders strictly to goods required immediately, and are showing a disposition to let their stock be exceptionally light or slightly broken rather than purchase at all freely. Manufacturers are quite generally resuming operations, but they are at the same time showing a conservative disposition not to produce many more goods than are quickly absorbed by the trade. It is gratifying to note the continued improvement in collections, and on this score there is much less complaint than a few weeks ago. The delay in the Senate in regard to the repeal of the Sherman act is causing some uneasiness.

The following report from Farwell, Ozmun, Kirk & Co., St. Paul, Minn., in regard to the condition of business in their market was received too late for use in our last issue:

The last two weeks have been quite uneventful in the trade here. Business is being conducted on a very conservative footing, and the volume of trade is considerably reduced from that of last September. This condition of things will doubtless continue to more or less extent during the fall. There will be considerable quantities of goods sold, but they are only for actual wants. Retail stocks will be kept as low as possible, and retail dealers will expect to pay up this fall as nearly as they can.

Collections are just beginning to show the results of this year's crop, and for a month to come cash receipts from the crop will probably not be much, though they will increase some from now on. The crop is light, but is of excellent quality. The price has advanced considerably, but it is still too low for the farmers willingly to accept, and this fact of itself will hold back the active movement of grain for some time to come. If the price of wheat should now advance 6 or 8 cents it would hurry the marketing of grain to a considerable extent, for we think that the farmers this year would then not hold grain for a further advance, as they have done in former years, but would accept the price and market the grain.

There will not be a very active jobbing trade this fall at best, and jobbers have made up their minds to this and are regulating their business accordingly.

Chicago.

(By Telegraph.)

The fall trade seems to have culminated, as business during the last week just about held its own with that of the previous weeks. The demand is still confined mainly to seasonable goods. General Hardware shows no improvement and jobbers are now satisfied that it will not improve until building becomes more active and industrial establishments are more fully employed throughout this district. Staple goods are moving in only moderate volume, which is perhaps less than that of two or three weeks ago. Brass Goods are doing somewhat better, and business is not quite so dull as it was in July and August. Tinware is in a little better request. The Heavy Hardware trade shows no change, the demand being confined almost entirely to Iron and Steel departments of such establishments. Collections are good, and little complaint is heard on this score.

St. Louis.

(By Telegraph.)

Business continues to improve, and, while the volume of trade for September will not compare very favorably with the corresponding month of last year, yet it shows a decided increase over July and August of this year. The demand for Stoves, Coal Hods, Stove Trimmings, &c., is very heavy, which is largely on account of the cold weather which is at present prevailing throughout the entire West. Wire Nails are enjoying a season of prosperity, although prices still continue low and unchanged. Collections are satisfactory.

Notes on Prices.

Wire Nails.—The demand for Wire Nails continues moderate, and in order to avoid accumulation of goods some of the mills are reducing production, with the possibility of shutting down before long if the conditions of trade do not soon show marked improvement. The orders received by them are for the most part for comparatively small lots, which are required promptly. In this condition of things it is not surprising that prices have weakened, and during the past week exceptionally low quotations have been made. The market at present is represented by the quotation of \$1.30 to \$1.35 for large lots at factory, some of the mills, however, refusing to meet these prices. The market is thus somewhat irregular, and the condition on the whole is far from satisfactory. It is understood that lit-

tle progress is making in the negotiations which for some time have been carried on between the manufacturers in regard to an agreement for the regulation of production or prices, and in the present state of the matter it is not thought that it will be immediately consummated.

Chicago, by Telegraph.—Manufacturers of Wire Nails report a good trade the past week, but it was confined to orders for immediate shipment. The influence of present business does not project itself far into the future, as some factories are again making arrangements to shut down, to remain closed until trade makes some decided improvement. The market is irregular owing to the efforts of certain manufacturers to unload some of their stock, although it is not understood to be heavy. General quotations for shipment from factory are about \$1.45, Chicago. Jobbers continue to quote small lots from stock at \$1.55 to \$1.60.

Cut Nails.—With the small amount of building at the present time there is naturally only a moderate demand for Nails, and the Cut-Nail market is decidedly sluggish. In sympathy with the lower prices ruling for Wire Nails, both Steel and Iron Cut Nails are weak in price. The market is represented by the quotation of \$1 for carload lots at mill, but it is understood that in some cases where the order is attractive, especially in the way of average, slight concessions are sometimes made. Small lots from store in New York are held at \$1.25 to \$1.30.

Chicago, by Telegraph.—Manufacturers of Cut Steel Nails report a good condition of business for the season, but orders are confined to carload lots and seldom run heavier. Prices are maintained at \$1.20 to \$1.25 for factory lots, while jobbers quote small lots from stock at \$1.30.

Barb Wire.—The demand for Barb Wire is moderate, and with more or less solicitude on the part of manufacturers to secure business prices are naturally somewhat irregular and slightly lower. The market is represented by the quotation of \$2.30 to \$2.40 for carload lots of Four-Point Galvanized at mill. Small lots from store are quoted at about the usual advance.

Chicago, by Telegraph.—The Barb Wire manufacturers are now cultivating the retail trade, and have consequently affected the price of small lots from stock. They are selling mixed carloads of Wire Nails and Barb Wire to this trade, and are absorbing a very

Being organized, put yourself in communication through your trade paper with other unions, get into correspondence, work toward a State union, but continue your own local work whether you get up a State union or not. The time will so n come when you can say to the prowling jobber or manufacturer: "Hands off!" and your command will be heeded.

RETAIL HARDWAREMEN, LET US UNITE OUR FORCES; IN UNION IS STRENGTH.

National Retail Hardware Dealers' Association.

IN RESPONSE to a call published in *The Iron Age* some weeks ago, signed by many of the leading retail merchants of the country, there met at Kimball Hall, Chicago, on the 20th inst. a most enthusiastic assemblage of hardwaremen.

A temporary organization was effected by the election of S. S. Bryan of Titusville, Pa., as chairman, and George J. Keene of Chicago, secretary. The object of the meeting, as stated by the chairman, was to consider the advisability of forming a National Association to promote a better feeling among retail merchants, and to endeavor to prevent the growing practice of manufacturers and jobbers selling to the consumer.

The meeting was then thrown open for discussion, when many spirited speeches were heard, which were marked throughout by a spirit of determination, but at the same time of moderation which will commend itself to the trade wherever situated.

In obedience to a motion the chair appointed the following Committee on Resolutions: H. W. Pickett, Warren, Pa.; D. F. Brown, St. Paul, Minn.; H. G. Janvrin, Boston, Mass., who reported the following resolutions, which were adopted:

RESOLUTIONS.

At a preliminary meeting of retail Hardware dealers, held at Chicago, September 20, 1893, an organization was perfected called the National Retail Hardware Dealers' Association. The need of organized effort to protect ourselves from inroads of manufacturers and jobbers and to promote a general feeling of confidence is fully recognized.

Resolved, That we demand of manufacturers and jobbers that they confine the sales of their wares to regular dealers, and that each and every member of this association pledges himself to use all reasonable efforts to enforce this demand.

Resolved, That if any manufacturer or jobber furnish goods to any one not regularly engaged in the retail trade, the dealers affected shall report the same to the secretary, with affidavits or other proper proofs. The secretary shall then correspond with the offending manufacturer or jobber and endeavor to adjust the matter, and in the event of failure to so adjust a complaint where the evidence is conclusive, the secretary shall report the facts in the case to the members of the association.

Resolved, That a cordial invitation is hereby extended to all regular and legitimate retail dealers to join with us in this association, and that they send to the secretary the amount of

dues for one year and receive their certificate of membership.

It was then moved that the Convention proceed to a permanent organization, and that a committee be appointed to draft a constitution and by-laws and nominate officers. Accordingly the Chair appointed a committee for this purpose. As a result of their deliberations, the following gentlemen were placed in nomination and unanimously elected:

President—S. S. BRYAN,
Titusville, Pa.
First Vice-President—F. B. ORR,
Chicago.
Second Vice-Pres.—SAML. MCKNIGHT,
Allegheny, Pa.
Treasurer—WM. T. HUMES,
Chicago.
Secretary—H. G. JANVRIN,
Boston.

DIRECTORS.

W. K. MORISON, Minneapolis.
J. G. BRICKMEYER, St. Louis.
IRVING A. SIBLEY, South Bend.
EDW. CHAMBERLAIN, Kalamazoo.
D. F. BARBER, Boston.
B. F. HOMER, Chicago.

The officers of the Association are ex-officio members of the board of directors. The membership fee was fixed at \$5, which will include the dues for the first year. The annual dues will be \$5.

An invitation is extended to all reputable retail hardware merchants carrying a stock of Hardware to join. Their co-operation is heartily desired by the officers and members.

The proceedings were marked throughout by harmony and the best of spirit. Those present will remember always with much pleasure the first national meeting of the retail Hardware dealers ever held. The success of this meeting augurs well for the success of the new association, and it commences its existence with every prospect for a long and honorable life.

It was a thoroughly representative gathering, being attended by representatives of every part of the country, and was an exceptionally pleasant and profitable meeting. It is intended to meet again next year and annually. The movement is thus inaugurated under very favorable auspices.

Export Notes.

ACCORDING to the financial plan for 1894 just presented by the President of the Argentine Republic to his Congress, many American articles imported into that State will still have the privilege of the lowest duty rates. The following products are among those on which only 5 per cent. duty will be charged—namely, Iron Wire, Plows, String and Wire for harvest work, Electric Engines and corresponding material, material for public gas lights, Freezing Machines, Motors of all classes, Sewing Machines, Needles, raw materials for all industries, and all necessary pieces for repairing machinery.

The general tariff on foreign goods is 60 per cent. of their value.

According to a late report of the British Consul-General at Bangkok the total value of imports into the Kingdom of Siam during 1892 was \$6,220,627, while her exports were \$6,575,490. Among the principal imports were \$401,990 worth of Hardware and Cutlery.

A German official report from Montevideo states that there is an increasing demand for Agricultural Machinery and Implements in Uruguay.

The British Vice-Consul at Puerto Plata, in a recent report to his Government, states that a promising opening for the importation of agricultural machinery is likely to develop in San Domingo, where the plow is taking the place of the primitive hoe, and thousands of acres of land which are now virgin forest are getting ready to come under cultivation.

The Belgian Vice-Consul at St. Thomas calls attention to the fact that with the construction of the second section of the Puerto Barrios Guatemala line, which is being pushed rapidly forward, a large increase of imports is likely to occur in that country.

Sporting Guns and Revolvers are forbidden to be imported into Bulgaria by a decree recently promulgated by the Government of that State.

A Troublesome Competition.

AN EXAMINATION of the catalogue issued by a well-known Chicago firm, who make a specialty of supplying grange houses, illustrates a form of competition which is becoming a serious matter in many sections. The catalogue is not, however, limited in its circulation to grange organizations, but can be obtained by any one, and the goods shown in it can be purchased by a person in any part of the country. Its circulation thus far has been limited for the most part to those connected with granges, farmers' alliance and similar organizations.

The catalogue before us, which is No. 54, is a paper-covered book 9 x 11 1/4 inches in size, and contains 576 pages. It is fully illustrated with descriptions and net prices of each article. The lines of goods represented include dry goods and notions, hats, jewelry, cutlery, optical goods, electrical goods, toys, musical instruments, patent medicines, sewing machines, clothing, cloaks, saddles, harness, Hardware, silver-plated ware, firearms, ammunition, sporting goods, stoves, shoes, baby carriages, trunks, crockery, lamps, carriages, agricultural implements, furniture, &c. The grocery list is separate, and is sent on applica-

tion. An index alphabetically arranged is placed at the end of the book.

This is certainly an alluring book to place in the family of a farmer or a dweller in a small town, showing a larger variety of goods than can be seen in half a dozen stores at home, and including necessities and luxuries for the entire family. The possibility of the farmer being put on an equal footing with the local merchant regarding prices is enticing. Having "750 clerks" awaiting their orders impresses on them the magnitude of the concern, and the venture has for them other attractions besides its novelty. Is it any wonder the retailer's customers order goods of a house who do a business of half a million a month, and whose 25 stenographers send the customers type-written letters? Blanks are furnished for orders, with explicit directions covering each step; also two pages of remarks and rules are found near the front of the book, to be read before ordering.

The Hardware trade are most interested in the 175 pages, more or less, of the catalogue devoted to goods which are handled by Hardware merchants, and the discounts for cash, which, of course, apply to all the goods in the book. The following table is given, under rule 4, of the amount of cash discount allowed when money accompanies the order:

On orders amounting to

| | |
|----------------------|-----------------------|
| \$10 and up to \$25, | 1 per cent. discount. |
| 25 " 50 | 2 " " |
| 50 " 100 | 3 " " |
| 100 " 150 | 4 " " |
| 150 and upward | 5 " " |

On orders for groceries, amounting to \$25 and over, 2 per cent. discount is allowed, except on sugar, which is net in all cases.

In the department devoted to Hardware are found carpenters' and mechanics' tools, strap and T hinges, wrought goods, barn-door hangers, locks and knobs, door bolts, cabinet locks, coat and hat hooks, screws, sash and doors, forges, carriage, stove and machine bolts, house-furnishing goods, shovels, spades, lawn mowers, fencing, wire goods, bells, wringers, screw hooks and eyes, &c.; and, in fact, an assortment of light and heavy Hardware which would be hard to duplicate in the combined stocks of Hardware in many a country town. A large proportion of the goods are represented by the trade numbers, as being of standard and reputable manufacture, thus enabling the customers to compare prices for the same number and size of goods at the merchant's store. From the following remarks it will be seen that the screws handled by this company are of a very superior quality: "These screws are well known and considered by all who use them to be superior to anything in this line made; we do not handle the cheap and inferior kinds usually sold by retail dealers." The following list of articles has been selected almost at random from the catalogue, as showing the range of prices quoted, which it would

be a hardship for the average Hardware merchant to meet:

| Files. | Each. | Doz. |
|---|--------------------|--------|
| 4-inch Tapers..... | \$0.04 | \$0.42 |
| 10 " Mill..... | .12 | 1.33 |
| 10 " Flat Bastard..... | .15 | 1.65 |
| Strap Hinges. | | |
| 4-inch light..... | .04 | .44 |
| 5 " "..... | .05 | .54 |
| 6 " "..... | .06 | .65 |
| 5 " heavy..... | .05 | .54 |
| Saw Sets. | | |
| Morrell's No. 1..... | .65 | |
| Nash's Lever..... | .35 | |
| Aikin's Hammer..... | .60 | |
| Auger Bits. | | |
| C. E. Jennings & Co.'s Dbl. Spur, 1/2 inch..... | .13 | |
| Genuine Russell Jennings, 1/2 inch..... | .30 | |
| Chisels. | | |
| Socket Firmer, 1/2 inch..... | .20 | |
| " " 1 "..... | .27 | |
| Meat Cutters. | | |
| Enterprise No. 10..... | 2.50 | |
| Little Giant No. 205..... | 1.50 | |
| Freezers. | | |
| Gem, 2 quart..... | 1.22 | |
| " 3 "..... | 1.46 | |
| " 4 "..... | 1.80 | |
| Wringers. | | |
| Empire, 10-inch rolls, 1 1/4-in..... | 3.25 | |
| Old Reliable, iron frame.... | 1.75 | |
| Traps. | | |
| Imitation New House No. 0, with chain..... | .11 | 1.25 |
| Imitation New House No. 1, with chain..... | .14 | 1.45 |
| Shot Guns. | | |
| Winchester, model 1893.... | 16.88 | |
| Screws. | | |
| Wood, flat head, 1/2 inch, No. 4..... | Doz. Gross. \$0.11 | |
| " " " 1/4 " " " 6..... | .02 | .14 |
| " " " 1 " " " 9..... | .04 | .25 |
| " " " 1 1/4 " " " 12..... | .04 | .33 |
| Bolts. | | |
| Common Carriage, 5-16 x 2 1/2 inch..... | Doz. \$0.08 | \$0.47 |
| Common Carriage, 3/8 x 3 in..... | .11 | .67 |
| " " 1/2 x 6 "..... | .23 | 1.90 |

Apparently no stone has been left unturned by the company that would add to the desirability of the house as a source of supply. The recipient of the catalogue is easily induced to send cash for the goods ordered, while his home merchant is extending him credit. The problem of how to overcome this and other evils which menace the retail Hardware business is now before the trade to decide.

Trade Topics.

Local Checks.—In regard to the question as to the propriety of the payment of bills by checks on local banks which are subject to expense for collection, we have the following communication from a well-known Pennsylvania house:

As all goods are payable at point of purchase, and as the purchaser's check is subject to discount, we cannot see how any good, honest dealer can consider his account settled by paying same in funds that are subject to discount. We consider it as consistent for a solvent concern to expect to settle its bills payable at 90 cents on the dollar.

We have also the following communication from "A Western Banker," whose article in regard to the propriety of giving local bank checks in payment of bills has called out an extended discussion:

I was glad to draw out the discussion I have done by my former article upon sending local bank checks in payment of bills. So far as the right and wrong of it goes there can be but one side, and that in favor of the one who sold the bill. His terms are based upon

payment being made at his store in check, draft or currency worth, at par the face of his bill.

That many retailers, like your Virginia correspondent, find it easier to send their own check on their local bank than to go to the bank and buy a draft on New York is not denied. But he might go still further and say it was easier not to pay his bills at all than to pay them. His position would be exactly as justifiable as it is to send a check whose net worth in New York is \$5.75 to pay a bill of \$6.

I see on our counter to day a check drawn on a bank in Taylor, Texas, for \$1, sent to Cincinnati in payment of a little bill of that amount. I suppose the dealer in Texas found it both easier and cheaper to send this check than it would have been to procure a postal note, express order or bank draft. But what he saves in time and cost is at the expense of the Cincinnati jobber.

Here is a check upon a Tyrone, Pa., bank for \$7.63 sent to a manufacturer in Michigan in payment of his bill of that amount. It will cost 25 cents to collect it and four days' time.

Here is a local check for \$1.48 sent from Tampa, Fla., probably because, as with your Virginia correspondent, it was the most convenient way for the man to remit, but in these times the check has no value whatever until it has been mailed back to the Tampa bank for a draft on New York, and this at a cost of time, postage and of the bank's charge for exchange.

In the present condition of bank matters, although there is a perceptible improvement, a good many checks are still going to protest, and not seldom the lawyer's fees for protesting a check are larger than the amount of the check. A great part of collecting is done by express and at a large percentage of cost, which cost has to be charged to the jobber.

The letter which we print below is from a jobbing house in Ohio. In it our correspondent gives his views in regard to the payment of accounts by local checks, the collection of which entails expense and delay:

If not too late I would like to record my views regarding the sending of local checks in payment of accounts. There is nothing more than good horse sense needed to convince one that it is an injustice to ask a house to accept in payment a piece of paper on which the face value must be discounted from 10 to 50 cents. As a rule, it is not the inconvenience that prompts the dealer to send his local check, but rather the time that is gained in its travels—from five to ten days. I am one of those jobbers who are supposed to make such large profits that items of 10 to 25 cents are of but little consideration. Our business is one of medium size and we are glad to say that we have but a few customers who insist upon sending local checks. It is no more right that the jobber should accept a check subject to discount than the dealer should receive his order for goods short or irregular in some minor part. We all have our annoyances in business and I sympathize with the dealer whose collections are tough, &c., but that is no reason why he should try to pass along these little annoyances. We should each do our share toward doing away with these little troubles, and if the local dealer insists upon sending his check we must accept it in a spirit of cheerfulness (?) and wait for an opportunity to get even. A JOBBER.

The Lawn Mower Exhibits.

IN THE NORTH END of the Horticultural Building at the World's Fair will be found quite a collection of exhibits of Lawn Mowers, Grass Carriers, Lawn Sweepers and other apparatus of use in the care of lawns. The manufacturers of these appliances have in some instances exercised commendable ingenuity in making their exhibits attractive to the passers-by, instead of depending solely on the display of an assortment of machines. Taken as a whole, the exhibition of these articles is not so large as might be reasonably expected from the extent of the trade in them and the number of firms engaged in their manufacture. There are some 20 establishments in the country making these machines, and it is estimated by good authorities that they turn out about 250,000 Lawn Mowers. What is lacking in quantity in the World's Fair display is, however, made up in quality.

THE CHADBORN & COLDWELL MFG. COMPANY of Newburg, N. Y., combine the spectacular with the practical in their exhibit. A miniature lawn, with a working model, extends over the rear portion of the place. A walking doll pushes a dainty Lawn Mower over an oblong course. Fountains are playing, a cataract rushes down a mountain side, and an oil painting in the background adds an illusion of distance to the scene. Arranged in the remainder of the space are specimens of all styles of Lawn Mowers manufactured by the company for both the home and foreign trade. The New Model, the New Model high wheel, the Rival, the Rival high wheel, the O K, the Excelsior Roller Mower and the New Excelsior horse Lawn Mower comprise the assortment, which also covers many sizes. A peculiar feature of the Rival is the device used to insure self-sharpening. This is done by making the bed knife concave. By means of the adjustment the edges of the revolving blades and bottom knife are brought in contact in such a manner as to invariably keep the machine in excellent condition. This feature is peculiar to the Rival Mower. A number of American and English New Model Mowers are shown piled in a vertical rack without handles, making quite a unique display. The English machines are fitted with six knives on account of the heavier growth of grass. The horse Lawn Mowers shown are of the kind used extensively on Government grounds and in public and private parks all over the country. The company also have a smaller exhibit of machines in the rotunda of the Horticultural Building. S. J. Edmiston, vice-president of the company, has spent considerable time in Chicago during the season, but the exhibit is directly in charge of W. B. Bastian, manager of the Chicago office, at 55 and 57 North Clinton street. The company also maintain a London office at 223 Upper Thames street, have an agency in Paris with Th. Pilter, another in Calcutta with T. E. Thompson & Co., and a number of agents in Australia.

GRAHAM, PASSMORE & Co. of Philadelphia make a good exhibit of both hand and horse Lawn Mowers. Everything in this line is put on the market under the name of Philadelphia Mowers. They show a specimen of

the old '69 machine, which was the first made by Passmore, and is thus historically interesting. Their new machines are made with the knives pitched front, making them easy to sharpen. They also have the driving gear on but one side, yet both wheels drive it. The absence of gravity on one side enables that side to go closer to a fence than is otherwise the case. They show several styles of machines, open and tight wipers, three and four blades, high and low wheels. A drop pawl ratchet is used, which makes a noiseless and very durable machine, as there is no wear on the ratchet in reversing the machine. Their 30-inch horse machines are built with seat and shafts or without. They have steel shafts and brass boxes. The 36-inch horse machine has a wrought-iron frame in front, adjustable either from handles in the rear or by the driver upon the seat. All these horse Mowers are thrown in and out of gear in the rear of the machine. They are made with solid or open wipers and have an exceptionally large roller back of the bed knife, which keeps the knife from running into small hummocks or bunches. A special Grass Carrier is made for their hand Mower. It has a hinged wooden bottom, strongly ironed, and sides of canvas. The front part of the bottom can be pulled back by a cord, so that the grass which collects there can be thrown further back into the carrier. The Philadelphia Lawn Sweeper shown is a 40-inch horse machine in which a roller gives motion to a revolving brush placed directly in front. The brush sweeps the sod clean and throws the sweepings into a large box in the rear, which can be easily dumped. W. K. Hawks represents the firm.

THE SUPPLEE HARDWARE CO. of Philadelphia make the largest exhibit of Lawn Mowers. They have an L-shaped space, giving them frontage on two aisles. The entire floor is carpeted in green, with some resemblance to a lawn. In the center stands a column, on the top of which is a large globe supporting a Pennsylvania Mower. Heavy cords extend from the top of the column to posts in the corners composed of Lawn Mower reels or wipers. The posts inclosing the space are Lawn Mower handles. Here are found a great assortment of Mowers, graded to suit all classes of buyers, from those willing to pay a good price for a very fine machine to those in search of one requiring but a moderate outlay. The samples shown comprise the Pennsylvania, New Departure, Continental, New Quaker City, Great American, and Rapid Transit. In all these machines tool steel is exclusively used in the knives, whether the machines are cheap or high-priced. The blades are rolled in ogee shape so that they can easily be sharpened. The various parts are interchangeable, requiring great nicety in manufacture, the factory being operated in this respect like a watch factory, with master gauges kept in reserve for frequent testing and the preservation of a correct standard. Among these machines the New Departure is peculiar, as embodying points never before adopted on a Lawn Mower. Two heavy spiral springs are applied to the cylinder bearings, keeping the cutting edges in close contact and making the Mower while in use positively self-sharpening. Each box of the cutter bar is a universal joint. It is expected to run almost an entire season without any change in the set or adjustment screws. Machines are shown for the English trade, with six knives, which cut down to $\frac{3}{8}$ inch. A Grass Gatherer is made for these specially, which goes in front of them to catch the cut grass. The company make their

own Grass Catcher for all machines, but it is suited to them only and not to other makes. It is claimed to carry 95 per cent. of all the grass cut. They also show their new pony or two-man Mower, which makes a 25-inch cut. A neatly-made wooden pony is harnessed in place, to secure a good representation of the manner of use. This Mower has a patent rear cut, with a train of gears and patent yielding bed knife, self-sharpening, with a shifting clutch to throw the Mower out of gear. The draft irons are so jointed that the Mower can easily be shifted from a straight course or drawn by a horse without treading on the uncut grass. The Pennsylvania horse Lawn Mower is shown with and without a driver's seat, cutting a width of 30 inches. In connection with the Supplee Hardware Company's Mowers are shown the Coles Mfg. Company's Coffee and Spice Mills. These are made in various sizes, from large hand or power Mills for grocers' use to small ones for families. They are made to be used specially for granulating or for pulverizing. The pulverizing Mills will grind grain as well as coffee. The grinders are made of cast steel, so constructed that they are self-sharpening. The parts are interchangeable. L. M. Hoge is in charge of the exhibit.

COLDWELL LAWN MOWER COMPANY of Newburg, N. Y., make a unique display of their goods. Recognizing the fact that people are attracted by exhibits in motion they have introduced this feature quite conspicuously. A mammoth hand Mower is supported at quite an elevation from the floor by wires from above, which hold the handle, and a rather slender post standing under the guard bar. The knives and wheels are constantly in motion. No means of communicating motion are visible, and much speculation on the subject is excited among the observers. The post is a pipe through which a shaft passes, operating a gear wheel. This is the largest hand Mower ever made, having a 60-inch spread, but it is, of course, made for exhibition and not for practical use. Another attraction in the same line is a representation of a lawn, around which a diminutive girl walks. The exhibit of machines covers both horse and hand Mowers. The horse Mowers comprise several sizes running down from 40 inches, the largest regularly made. The company not long since built a 50-inch Mower for a Boston customer on a special order. There are some novel points about the Coldwell horse Mower worthy of special mention. Evenness of cut is secured by a patent adjustment which raises or lowers the two sides at the same time by a simple lever movement. The same device also raises the knives when driving over gravel walks or roads. The lever is in front on the guard bar, easily reached by the seated driver. Another lever on the side, also easily reached, throws the knives in or out of gear, and cannot be shaken out of place by the motion of the machine. The hand Mowers include the Imperial, the high wheel Imperial, Coldwell's Standard and the New York. Of these the Imperial is the leading machine, embodying all the improvements suggested in the long experience of Thomas Coldwell. This machine has his positive triple ratchet, which runs without wear and almost without noise. The frame is made so rigid that the adjustment cannot be jarred or twisted, so that the machines will bear rough handling in shipment or in use. Mr. Coldwell is in regular attendance at this exhibit.

GLENNON & KRAUSE, Seventy-sixth and Wallace streets, Chicago, exhibit the Grass Carrier known as the Lawn Mower's Partner. In addition to the

standard patterns made for ordinary use, they show one with the pouch made of satin elaborately embroidered. On the outside, which is dark green in color, are autumn leaves, clover leaves, clover in bloom and daisies. The interior is lined with orange-colored satin, on which are pansies. A silk banner with silver fringe ornaments the top. Heavy gold cord and tassels are used to decorate the rim.

WIRT & KNOX MFG. COMPANY., of Independence, Mo., exhibit Wirt's patent all-iron Hose Reels. These Reels are constructed entirely of wrought-iron pipe and malleable iron, are perfectly frictionless, are claimed to be indestructible and are very handsome in appearance. They have a capacity of 100 to 500 feet of $\frac{3}{4}$ -inch hose, or 100 to 300 feet of $2\frac{1}{2}$ -inch rubber fire hose. The company also manufacture an all-iron park Reel, with a capacity of 200 feet of $\frac{3}{4}$ -inch, or 400 feet of $2\frac{1}{2}$ -inch rubber hose. They further make Dion's patent Metal Wheel with wire spokes for use on their park Reels, or for agricultural implements.

PORTLAND LAWN SPRINKLER COMPANY of Portland, Maine, exhibit a decided novelty in the Little Giant Traveling Lawn Sprinkler. This is a revolving Sprinkler mounted on a three-wheeled truck. The post of the Sprinkler has a worm gear on the lower end which communicates motion to the two wheels in front, so that the machine gradually travels over a lawn while it sprinkles, dragging the hose. The rear wheel is a guide wheel which can be set to make the machine travel in either a straight line or a circle of any diameter. The speed of the travel can be regulated, or it can be set for a certain distance on a figured dial and it will stop automatically, or it can be used as a stationary sprinkler. It can also be gauged to throw water from 5 to 50 feet in width. With a pressure of 20 pounds it will drag 75 feet of hose, while with 60 to 70 pounds it will carry a load of 200 pounds and drag 200 feet of hose. These sprinklers are shown at work on the lawns in the World's Fair grounds.

THOMPSON MFG. COMPANY, Elkhart, Ind., have a fine display of Lawn Sweepers. These Sweepers are made in different sizes, suitable for public parks, large lawns or small lawns. A revolving brush in front moves very rapidly, throwing the litter backward from its under surface. Immediately behind the brush, and parallel with it, a thin shoe passes along over the ground, with its upper surface inclined. The operation involves the principle of "dust pan and broom." In addition to this, the fan-shaped brush creates a strong current of air that blows the litter back into the rear of the hopper. If sticks or stones are encountered, the shoe does not allow them to pass under it, but provides a passage over it into the hopper. The hopper is easily lifted out and emptied. The Sweepers are nicely painted and are very attractive in appearance.

Quite a display of Lawn Mowers is also made in connection with farm implements in the annex to the Agricultural Building. A description of these exhibits follows:

THE WHITMAN & BARNES MFG. COMPANY of Akron, Ohio, show samples of their high-wheel Mower, Little Witch and Grass Widow, beautifully finished in nickel with ornamental handles of rare wood. The high wheel has the W. & B. split bushings, an adjustable handle which may be used loose or rigid, an open wiper with four steel blades, and is of remarkable lightness of draft. The other ma-

chines have excellent points, but are sold at a lower price.

THE THOMAS MFG. COMPANY of Springfield, Ohio, exhibit their Lawn Mowers neatly arranged in pyramid form, topped by a model having bronzed reel and steel knives. Among those so shown are the Thomas, Mabel, Miller and Ideal of standard sizes, and the high-wheel Greyhound, also manufactured by the Thomas Company.

MAST, FOOS & Co. of Springfield, Ohio, supplement a fine display of Pumps, Buckeye Fencing and the Columbia Steel Windmill, with an extensive line of low-wheeled Lawn Mowers, including the Buckeye, New Buckeye and Jewel. Handsome hardwood handles grace these machines, attracting much attention and praise.

THE FARMERS' FRIEND MFG. COMPANY of Dayton, Ohio, exhibit the New Idea Lawn Mower in full nickel plate. This machine is supplied with a spring grip and does away with all pawls and ratchets, runs noiselessly, is easily ad-

this particular firm. A noticeable feature in the arrangement is the ingenuity and good judgment shown in the selection and placing of the tools, thus displaying the name to the best advantage; for which work W. C. Henry, one of the firm's salesmen, deserves great credit.

Trade Items.

THE TAUNTON WIRE NAIL COMPANY, Taunton, Mass., advise us that they cut all of their steel wire Carpet Tacks from soft Bessemer steel wire, liquor finished, cut with a heavy countersink to avoid the flying off of the heads or breaking off of the points. Not pickling the Tacks in acid is referred to as making it possible for carpet layers to put the Tacks in their mouths without irritating them. They also cut a special Tack, and carry it in stock for expert carpet layers. This Tack has a small head and an extra long, sharp point. Their common goods are put up in the regular case

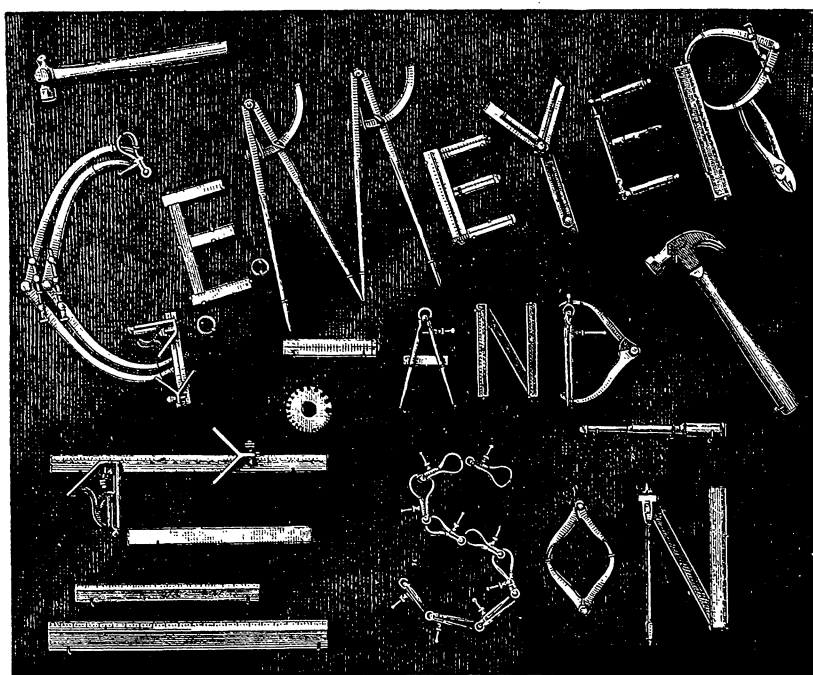


Fig. 786.—G. E. Meyer & Son's Window Display.

justed, and avoids unnecessary wear of the reel boxes. It is a high-grade, high-wheel machine constructed to cut high grass with ease. The low-wheel standard machine manufactured by the Farmers' Friend Company, named the First Choice, is not shown in the exhibit, although the company regard it as one of their best products.

G. E. Meyer & Son's Window Display.

THE accompanying window display, Fig. 786, is reproduced from a photograph, for which we are indebted to G. E. Meyer & Son, South Bend, Ind. The card was arranged on boards covered with cloth, and served the double purpose of calling the attention of customers and passers-by to the fact that the firm handle a fine line of Machinists' and Mechanics' Tools, while it associates the keeping of these goods in the observer's mind with the name of

lots, and also in gross boxes, assorted, in papers and miniature kegs, for the smaller trade. Their business is mostly Wire Tacks and special Wire Nails, taking any kind of Tack or Nail, from $\frac{1}{4}$ -inch, No. 19, to 3-inch, No. 11, and making any kind of head or point, to be used for some special purpose, as they state they have exceptional facilities for doing such work. They are also making a special Box Nail, Bluco finish, with the special box point, for use with nailing machine or for hand nailing. It is explained that this Nail has a holding power of 7 per cent. more than a common bright Nail. They also make a bright Clinch Nail, with a flat point.

J. B. SHANNON & SONS, Philadelphia, have again opened at 1020 Market street, from which they were driven by the fire of April 21 last. The damaged building has been thoroughly remodeled and refitted to suit the varied wants of the business. The new store has been filled with a fresh stock of Hardware, Cutlery, Brass Work, Tools, Agricultural Implements, &c. The manufacturing department now

occupies separate quarters, the firm having purchased the property at the southwest corner of Eleventh and Catharine streets.

GENDRON IRON WHEEL COMPANY, Toledo, Ohio, have put a double tube drop-frame Bicycle on the market for misses, in other particulars similar in construction and size to their boys' Little Scorchers. The new wheel is known as the Little Princess.

E. M. SARGENT, Southern representative for Supplee Hardware Company, Philadelphia, favored each of his customers with an oxidized Screw, cut in two just above the thread, and ingeniously fastened together by a pin at the back. It was sent out in connection with his notices in regard to his fall trip.

HARRISON BROS. & HOWSON, Sheffield, England, and 126 Chambers street, New York, are exhibiting samples of fine table Cutlery, in dinner, fruit and other Knives, with carved mother-of-pearl handles, stag from which the outer covering has been removed, leaving it white, and then engraved, &c. A large portion of this class of goods are heavily silver plated on the metal parts. They also have a Knife Sharpener with two to six revolving wheels, with which to quickly renew the edges of Carvers and other Knives. While not entirely new they claim to have but recently introduced them in this country.

JAEGGER & Co., 124 Chambers street, New York, manufacturers of Tin Toys, Metal Stamps, &c., for the jobbing trade, have brought out for the coming season a toy of tin suitable for small children. It has a wood handle about 18 inches long and a wire support at the other end, with two small iron wheels. When drawn or pushed the wheels in revolving cause a tin animal to move back and forth, at the same time ringing a bell underneath. The assortment of animals consists of a horse, sheep, goat, dog, lamb and rooster. The tin portion is decorated in different colors.

AMERICAN LEAD PENCIL COMPANY, 50 Howard street, New York, have commenced the manufacture of stove polish from graphite products and will be pleased to forward samples and information to those interested on application.

Prize Competitions.

IN CONNECTION with the movement among Hardware retailers with a view to forming an organization for the protection of their interests Competitions Nos. 26 and 27 are of special interest. Competition No. 26 relates to the question as to the extent to which manufacturers and jobbers are justified in selling to consumers, and the papers we have received look at the matter from the different standpoints of the parties in interest. The committee to whom the papers were referred have awarded the prizes as follows:

- First Prize to A. D. BANKER.
- Second Prize to J. E. JANSSEN.
- Third Prize to E. G. LUFKIN.

Prize Competition No. 27 is in regard to local organizations of Hardware merchants, and the opportunity thus given for an understanding or an association among the retail merchants in a town or city with a view to the protection of their interests. The scope of such associations, their difficulties

and advantages, are considered, and the subject as a whole has been covered in an able and interesting manner. The committee to whom the competitions were referred have awarded the prizes as follows:

- First Prize to A. H. HOPE.
- Second Prize to F. H. WOODWORTH.
- Third Prize to J. ROBERT RAINEY.

As especially timely at this juncture, when the announcement is made of the organization of a national society, we give place in another column to the paper of A. H. Hope, to whom the first prize was awarded.

Weed & Co.'s Seventy-fifth Anniversary.

WEED & CO. of Buffalo, N. Y., celebrated their seventy-fifth anniversary on Saturday, September 23, and the occasion was exceedingly enjoyable. Letters and telegrams of congratulation poured in, while hundreds of friends, patrons and well wishers called during the day to express their kindly feeling and good wishes for the future. Floral tributes from Buffalo business men were displayed in the rear office, and many representatives of leading Hardware firms in different parts of the country were present in honor of the event.

The windows and interior of the store were neatly decorated with flags, bunting and other ornamentation, palms and potted plants, while the atmosphere was laden with the fragrance of flowers. Pedestrians stopped to gaze at a large and accurate drawing of the little wooden structure that served as a store on the same corner 75 years ago, while the ancient and weather-beaten sign that did service at that time came in for its share of attention. These interesting articles occupied a window in the store.

There were exhibited several framed receipted bills of sale of the old firm, one dated 1821, being made out for Captain Daniel Dobbins, a pioneer lake navigator. Another was dated 1824 and made out for James Sweeney.

Very handsome souvenirs of the day were distributed to visitors and customers. They were silver-plated paper weights in several finishes, and rich silver spoons, engraved in the bowl. Upstairs over the main store a fine lunch was served at noon. An orchestra was stationed in an adjoining room.

But amid all of these festivities, gaiety and good will, nothing could have been more significant or enjoyable to Mr. Weed than a number on the programme of which he was not aware. The managers of the several departments in his establishment had jointly purchased a beautiful diamond ring as evidence of the esteem in which their honored employer and friend was held by them.

The presentation of this token was a complete surprise to Mr. Weed. E. C. Neal, who has for 13 years been a valuable employee of the Weed store, made the presentation speech in the following well-chosen words:

Mr. Weed, the event which we celebrate to-day is a rare occurrence in the annals of business history, it being the seventy-fifth anniversary of the founding of the Hardware business on this site.

During this time many changes have taken place. Business houses have been established that have long since passed into oblivion, some because of financial embarrassment, others of lack of good management, but through all this time this establishment has remained, having withstood the adversities to which others succumbed. From its inception to the present time, by persistent effort, by judicious management and honorable dealings, Weed's Hardware store has won for itself a position most enviable.

To no one more than to yourself belongs the credit of having attained this high position. This is attested by the many letters of which you have been the happy recipient within the last few days. Believing as we do that you are justly entitled to the compliment already bestowed upon you, we, the managers of the various departments desire to give to you our heartiest congratulations for the prosperity that you have enjoyed, and to extend our best wishes that the future may have in store for you still greater success.

But in order to give more tangible expression to our feelings, permit me, in behalf of the gentlemen assembled here, to present to you this ring, as a token of our regard for you. As you wear it, may it be the means of bringing to your mind thoughts of the pleasant associations which we have enjoyed in the past. And may it be a harbinger of the time to come, when God willing, you, and mayhap some of us, shall stand here in 1918 to celebrate our centennial.

Price-Lists, Circulars, &c.

THE GOULD-MERSEREAU COMPANY, 261-263 Canal street, New York: Brass Bedsteads and Brass Goods. Brass Bedsteads are shown in one catalogue in a variety of styles, with descriptions and prices. The Bedsteads are referred to as superior in finish and design, rich and elegant as an article of furniture and very cleanly. Prices are given for Bedsteads finished in brass; they can also be finished in oxidized silver, bright or antique silver, or bright gold, or can be made to match any finish in door trimmings or chandelier work. In arranging the catalogue devoted to brass goods the desire has been to place before the trade a good variety of the leading sellers at the latest market prices. The book contains 176 pages descriptive of Easels, Tables, Cabinets, Chevals, Shaving Stands, &c.; Curtain Poles and Trimmings, Vestibule Rods, Tassel Hooks, Drapery Rings, Shade Pulls, Brass Tassels, &c.; Stair Rods, Stair Buttons, Matting Buttons, &c.; Carpet Layers' Tools and supplies.

ENTERPRISE MFG. COMPANY, 17 Milk street, Boston: The Falls Heater. The Heater is placed over the top of a lamp chimney to heat the surrounding air and cause the heated air to be diffused throughout the room. Numerous testimonials attest the favor with which the Heater has been received.

NICHOLAS BROTHERS, Greenfield, Mass.: Catalogue of Knives, &c. Their line includes butchers' and cooks' Knives, market and packing house Cleavers, abattoir and butchers' Steels, grocers' Cheese Knives, Butter and Lard Spades, Bread Knives, Ham Slicers, Carvers, Roast Beef Triers, Ham Stringers and Trier, &c. Par-

ticular attention is directed to their complete line of Cleavers, Choppers and Splitters in their illustrated catalogue.

DALZELL AXLE COMPANY, South Egremont, Mass.: Illustrations show Collinge Axle, coach and bed Axle, with solid flap for springs, cranks and flaps; Pray spring washer Axle, mail patent or bolt Axle, Concord bus Axle, short-bed half patent, short bed swelled taper and half patent fantail Axles, Stever's long swell Axle, short-bed sulky and long-bed sulky Axles, &c. The aim in preparing the catalogue has been to furnish a list as far as possible of Axles manufactured by them, with illustrations of styles when deemed necessary, thus enabling one not familiar with their work to order understandingly.

SCOVILL MFG. COMPANY, 423 Broome street, New York: Pamphlet of aluminum fancy goods, with net wholesale prices to the trade. This contains illustrations of a portion of their art goods of this material, suitable for holiday trade. Among the articles noted are Match Boxes for the pocket, Vases, Shaving Cups, Smoke Sets, Card Cases, Mirrors, Easels, Bouquet Holders, Picture Frames, Bon-Bon Baskets, Puff Boxes, Cigar Cases, Napkin Rings, Pin Trays, Tea Strainers, Trays, Drinking Cups, Tripods, &c.

THE CINCINNATI CORRUGATING COMPANY, Piqua, Ohio: Corrugated and other sheet-metal building material. Their catalogue shows a complete line of their goods, including patent edge Corrugated Iron, Standing Seam and Roll and Cap Steel Roofing, V-Crimp Roofing, also various forms of Siding and Ceiling. In addition to the above the company manufacture a full line of Juniata Galvanized Iron and American Terne Plate. A separate pamphlet is devoted to "The Life of an Iron Roof, or How Long Will It Last?"

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: Catalogue of fall and winter goods. The price current illustrates Axes, Hatchets, Axe Handles, Wedges, Saw Sets, cross cut and wood Saws, Coffee Mills, Lanterns, Lamps, Lamp Stoves, Hollow Ware, Meat Cutters, Elbows and Pipe, Stove Polish, Coal Hods and Vases, Stove Boards, Chains, Corn Huskers, Registers, Snow Shovels, Sifters, Sleds, Skates, Electric Bell Outfits, Flat Plated Ware, Carvers, &c.

THE SELF-POURING OIL COMPANY, 1430 South Penn square, Philadelphia: Self-Pouring Oil Can. A safety pin is stuck through one end of the company's card with this explanation: "This is a 'safety pin.' With it 'pin your faith' to the Self-Pouring Oil Can, a 'safety' lamp filler. You can't get stuck."

It Is Reported—

That fire broke out in the Hardware establishment of Neveux, Clinton & Baxter, Windsor, Ont., on the morning of the 20th inst., entailing a loss of about \$20,000 on stock and building.

That M. Frankovitz's Hardware store, at Fergus Falls, Minn., was visited by fire on the 18th inst. The loss was \$3000, fully covered by insurance.

That Frank Green's Tin shop, at Adairville, Ky., was destroyed by fire on the 17th inst.

That McGrew & Son's Hardware store, at Irwin, Pa., was robbed on the

18th inst. of \$25 worth of Revolvers, Razors and Cartridges.

That Tracy Bros' storehouse, at Troy, N. Y., was destroyed by fire on the 20th inst. The storehouse was filled with Stoves, Hardware and Wooden Ware. The loss is estimated at \$5000, with insurance of \$3600.

That H. R. Wheeler, Northboro, Mass., is disposing of his stock of Hardware, &c., with the intention of leaving that place October 1.

That E. B. Merriam, Coos, N. H., is closing out his stock of Hardware to Taylor & Son.

That the store of the Davis-Hartford Hardware Company, Berthoud, Col., was visited by burglars on the 17th inst. The safe was blown open and a valuable gold watch and chain abstracted. About \$35 and other watches and some jewelry were left untouched. It is generally thought that the burglars expected to find the \$15,000 life insurance money which was recently paid to the widow of the late John Hartford. It is estimated that the safe and other property of the firm is damaged to the extent of \$400. There is no clue to the robbers.

That Charles Prather has opened a Stove and Tin store at Manchester, Ohio.

That the Hardware store of F. L. Leighton & Co., New Haven, Conn., was slightly damaged by fire on the 19th inst.

That burglars recently broke into the Hardware store of O'Connor Bros., Washburn, Iowa, and stole a quantity of Cutlery.

That J. B. Fonda, Hardware merchant, Batavia, N. Y., has sold his stock of goods to Mrs. Julia Sheldon of Rochester, but will continue to conduct the business as her agent.

That Chas. B. Halcom, Tariffville, Conn., will soon add a Stove and Tin Ware department to his Hardware, coal and lumber business. The Tinware and Stove department will be under the supervision of George W. Roberts.

That C. F. Thompson, Brattleboro, Vt., has disposed of his Hardware business and stock to Robbins & Cowles and Mellen & Proctor, the stock being equally divided between them.

That E. E. Shuck's Hardware store, at Parnell, Mo., was destroyed by fire on the 14th inst.

That the Hardware store of Graham Watts, Honesdale, Pa., which was burglarized last December, was again visited by thieves on the 13th inst. and 60 Razors, 6 Revolvers and 9 boxes of Knives taken. The entrance was effected by inserting a jimmy in the lock of the front door and prying the bolt back.

That Rumbols & Cumming's Hardware store, at Bunker Hill, Ill., was destroyed by fire on the 15th inst.

That the Hardware store of McDowell, Jameson & Co., Dalton, Ohio, was burglarized on the 16th inst.

That Joseph Guthrie's large Hardware and Implement store, at Erie, Ill., was broken into by burglars on the 16th inst. The robbers entered the establishment through a rear window. After blowing open the safe and securing all that was in it of value to them they went through the house from top to bottom, taking everything they came across that could be easily carried off. The booty consisted of Shotguns, Ammunition, silver Knives and Forks, Cartridges, Revolvers, &c., and is valued at \$800.

That Ott & Boden's Hardware store, at West Bend, Wis., was recently destroyed by fire. The loss is estimated at \$40,000.

That D. W. Nichols & Co., Bloomfield, Neb., have sold out their Hardware stock to M. S. Goff.

That Joseph F. Smith, Essex, Mass., has disposed of his Stove and Tinware business to O. C. Story.

That J. G. Hoffman has retired from the Ort-Berkley Hardware Company, Goshen, Ind., owing to ill-health.

That W. W. Harrington has been succeeded by Harrington & Weston in the Hardware and Implement business at North Branch, Mich.

That J. B. Henry is building an additional story on the rear part of his Hardware store at Waterford, Pa.

That the store of Adams & Rheinhart, Grand Forks, N. D., was recently robbed of \$200 worth of goods.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Between the gyrations in prices of Linseed Oil and the irregularities in White Lead there is enough variety to the market for various lines of Paints and Colors to be quite interesting, but speculative tendency is dormant and thus far neither wholesale nor retail dealers have done anything indicative of the tendency to depart from the straight path of conservative action. As a matter of fact orders have been placed in a manner indicating that buyers are content with going slow and leaving the future for later consideration. As natural with the advance of the autumn season there is some expansion of business in prepared Paints, leading pigments and most lines of base material, but the change has not been sufficient to alter the general status of the market. Prices, therefore, continue more or less irregular, and it is the rule that where changes have occurred the buyer has gained more or less advantage.

White Lead.—The aggressive disposition of "outside" corrodors is not visibly modified, nor does it appear that manufacturers of "quick process" or mixed Leads lose any opportunity to extend the outlet for their goods. The great aggregation of corrodors represented by the National Lead Company profess indifference to the ambitions of the other interests and affirm that the old list prices are, as far as they are concerned, being maintained. It is no secret, however, that this interest does not turn down orders in sections where the "independent" concerns offer dry Lead at 5¼¢ @ 5¾¢ and necessarily have to meet those prices, nor is it a mere suspicion that jobbers deal out small lots of the combine brands at less than official schedule rates. As a matter of fact, the market is unsettled and irregular, while business hardly comes up to the average for this season of the year.

Red Lead.—Operations in foreign brands have been on a smaller scale, and the demand at present is somewhat in contrast with the average previously this month. Importers offer reservedly, however, and stand out for full previous prices. American brands have met with fair sale, faring better, if anything, than they did during the previous week, but show no change in price.

Litharge.—Good orders have been placed for forward deliveries and the volume of business thus far this month is said to be quite up to the September average, more particularly in low-grade product consumed by glass and rubber manufacturers. There has, however, been no difficulty in securing supplies at former prices.

Zincs.—The market for American Oxide is a little irregular. The position of base material has changed somewhat for the better during the past week or ten days, but accumulations from previous production, along with some departure from old lines of harmonious action, have certain weight, and back of that is alleged irregularity in prices of some foreign brands that tend to aggravate affairs. No positive changes in prices are announced, but the market shows symptoms of underlying softness, and careful buyers in a position to operate on a cash basis can doubtless secure special favors.

Colors, &c.—There is not a distinctly new feature in the market for Dry Colors. Business has been commonplace, the demand is strictly perfunctory, and prices vary within extremely narrow bounds. A turn for the better in the Linseed Oil market serves to give more tone to leading lines of Oil Colors, but, like other goods, they are purchased only as well-defined wants dictate. Ready-mixed Paints have been meeting with somewhat better sale, but the improvement is hardly up to what might reasonably be looked for at this season of the year. Prices continue low and irregular.

Oils and Turpentine.

The prominent feature in the market for Animal and Vegetable Oils is a further hardening of prices for Cotton Seed, Lard products and some minor goods that turned for the better last week, a radical change in the Linseed Oil situation and, generally speaking, a broader volume of business. Speculation has had no part in making or turning the markets. To the contrary, the improvement seems to rest on the solid foundation of good legitimate trade demand and favorable statistical position combined with enhanced cost of various crude materials. In short, the leading goods seem to be in better position just now than they have been at any previous time during the past two or three months.

Linseed Oil.—New York City crushers have advanced their prices to 40¢ for Raw and 43¢ for Boiled Oil made from American seed. In doing this they followed the lead of their Western allies, who practically withdrew from the market temporarily. It is

Cotton-Seed Oils.—There has been a further advance in prices. Prime quality Crude Oil has been sold at up to 37¢, Summer Yellow to 40¢ and other varieties at corresponding figures. A certain amount of speculative interest has developed, but good purchases by exporters and large Western consumers figure as the mainstay of the market.

Lard Oil.—Most city pressers have advanced their price for strictly prime Oil to 70¢. Receivers of Western brands are asking the same price. The advance is due chiefly to higher cost of raw material, but substantial support has been given in the shape of good average trade demand.

Fish Oils.—On the market for crude Sperm, Whale and Menhaden Oils there is nothing distinctly new to report for the past week, dealings having been ordinary and at former prices, while demand is momentarily rather slow. The pressed and bleached Oils are moving out fairly in a jobbing way at about previous prices. Cod Oils steady at old figures and in fair demand.

Miscellaneous.—Common Olive Oil in barrels is easier at 58¢ on the spot and 55¢ @ 56¢ for forward shipment, with only a routine business passing. Coconut Oils have undergone only fractional change in price and sell rather slowly. Red Oils are slow of sale and slightly weak in price.

Spirits Turpentine.—Purchases have been on a rather more liberal scale, and the market has improved slightly in tone. Late sales ex dock were at 28¢ for regular and 28½¢ for machine barrels.

Brace Bit Gauge.

T. G. Ellsworth, 85 Chambers street, New York, as exclusive sales agent, is putting the Wilks & Whitus brace bit

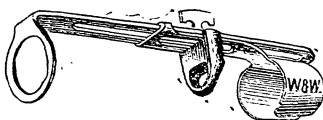


Fig. 1.—Brace Bit Gauge.

gauge on the market, as shown in Fig. 1. It consists of a band which slides upon the gauge, these two parts being held together by a sliding nut and thumb screw. The nut has an opening

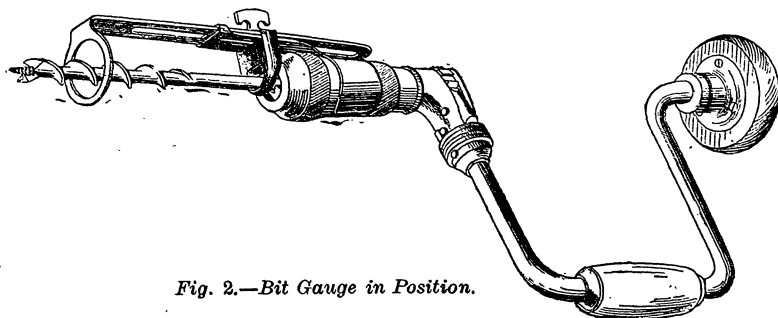


Fig. 2.—Bit Gauge in Position.

not admitted that the conflicting out-of-town producers have buried the hatchet. To the contrary, the National Company leave it to be inferred that late heavy sales of Oil, along with higher cost of raw material, are responsible for the advance. Whatever the facts in this connection, there is most remarkable cessation of contest on suggestive intimation of a further advance in prices next month.

through which the shank of the bit passes before being fastened in the brace. The ring foot of the gauge has a 1½-inch opening, allowing for the use of a 1-inch bit. The gauge fastens on the brace and not on the bit, but revolves as the brace is turned. For attaching the gauge to the brace or bit stock, as in Fig. 2, the knurled nut or nozzle that holds the bit is unscrewed

from the brace and the nozzle is placed inside the band of the gauge. The sliding nut with the thumb screw is placed firmly against the nozzle and the thumb screw tightened, after which the nozzle is screwed upon the brace, and the gauge is ready for use. The band is open so that by expansion or contraction it can be made to fit a larger or smaller nozzle.

CONTENTS.

| | PAGE. |
|--|-------|
| The Forter 40-Ton Ladle Crane. Illus... | 551 |
| Manganese Steel | 552 |
| The Bessemer Process as Conducted in Sweden.—I..... | 552 |
| The Western Foundrymen's Association. | 554 |
| Old and Modern Water Works Machinery. Illustrated..... | 555 |
| The Porter Adjuster for Electric Lights. Illustrated..... | 556 |
| The Ferracute Inclinable Bench Press. Illustrated | 557 |
| World's Fair Notes | 558 |
| The Garvin Profiling and Die-Slotting Machines. Illustrated..... | 559 |
| Anhydrous Ammonia Gas as a Motive Power. Illustrated..... | 560 |
| San Francisco News..... | 563 |
| The Week..... | 564 |
| Editorials: | |
| The Loss of Profits to Manufacturers.. | 565 |
| Standard Rail Sections | 565 |
| Structural Work in Chicago | 565 |
| Copper as a Carrier of Silver..... | 566 |
| Recent Railroad Accidents..... | 566 |
| Correspondence | 566 |
| Washington News..... | 567 |
| Effect of the Panic on the Banks..... | 567 |
| Obituary..... | 568 |
| Personal | 568 |
| Manufacturing: | |
| Iron and Steel..... | 569 |
| Machinery..... | 569 |
| Hardware..... | 570 |
| Miscellaneous..... | 570 |
| Trade Report: | |
| Chicago..... | 571 |
| Pittsburgh..... | 572 |
| Cincinnati..... | 572 |
| Philadelphia..... | 573 |
| St. Louis..... | 573 |
| Financial..... | 574 |
| Metal Market..... | 574 |
| New York..... | 575 |
| British Iron and Metal Markets..... | 575 |
| Trade Publications..... | 575 |
| A Modern Factory Building..... | 576 |
| The New Western Scale..... | 576 |
| Hardware: | |
| Condition of Trade..... | 577 |
| Notes on Prices..... | 577 |
| Hardware Club in Melbourne..... | 578 |
| Retailers' Associations | 578 |
| National Retail Hardware Dealers' Association..... | 579 |
| Export Notes..... | 579 |
| A Troublesome Competition..... | 579 |
| Trade Topics..... | 580 |
| The Lawn Mower Exhibits..... | 581 |
| G. E. Meyer & Son's Window Display. Illustrated..... | 582 |
| Trade Items..... | 582 |
| Prize Competitions..... | 583 |
| Weed & Co.'s Seventy-fifth Anniversary..... | 583 |
| Price-Lists, Circulars, &c..... | 583 |
| It Is Reported..... | 584 |
| Paints and Colors..... | 584 |
| Brace Bit Gauge. Illustrated | 585 |
| Ivory Tang Razor. Illustrated..... | 586 |
| The Columbian Washer. Illustrated.. | 586 |
| Portable Drilling Machine. Illus..... | 586 |
| Adjustable Soaking Shoe. Illustrated.. | 587 |
| Jones' Nail-Keg Holder. Illustrated..... | 587 |
| Ball-Bearing Wringer. Illustrated.... | 588 |
| The Winchester Model 1893 "Take Down" Rifle. Illustrated..... | 588 |
| Leather Loop Pher. Illustrated..... | 588 |
| Current Hardware Prices | 589 |
| Current Metal Prices..... | 596 |

Ivory-Tang Razor.

The accompanying cut represents a style of razor which is being put on the market by Alexis Whitte, 47 Warren street, New York. The principal feature of the razor is the ivory tang which

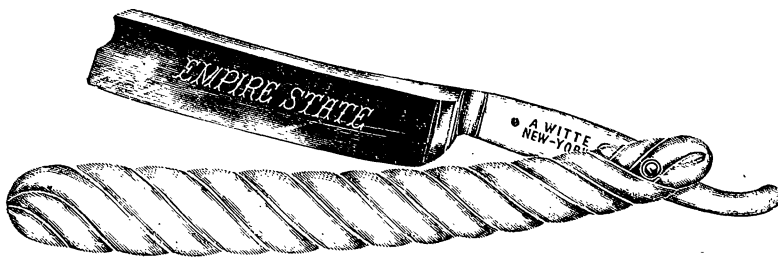


Fig. 1.—Ivory-Tang Razor.

is securely fastened to the blade. As shown in Fig. 2, the tang is cut part way through its length, the blade inserted in the opening, and held in place by two rivets. The bolster finish given to the blade at the end of the ivory tang adds much to the appearance of the razor. The point is made that the ivory tang lightens the razor and prevents this part from becoming rusty, thereby causing the razor to open and

to wear out. The holes in the pin wheel are made flaring, so that the pins are firmly wedged to prevent them coming out even when they get dry. The bottom of the washer is of galvanized iron, put on with white lead and packing. There is also a corrugated false bottom, which is raised from the main



Fig. 2.—The Top of the Blade.

close with difficulty. The cut represents one of the many designs in which the handles for these razors are made.

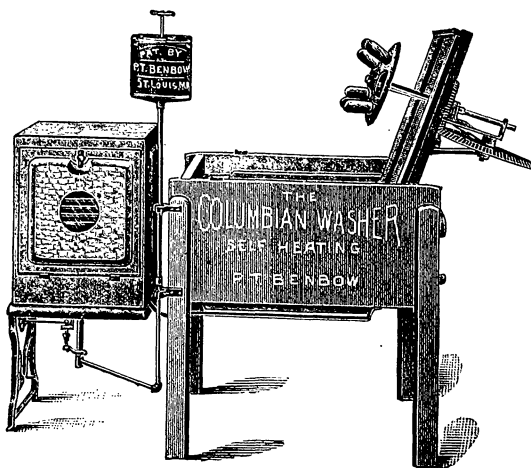
The Columbian Washer.

The Columbian Washer, as shown herewith, is being introduced by P. T. Benbow, 1814-1816 North Eighteenth street, St. Louis, Mo. The pin wheel is malleable galvanized iron, with a galvanized shaft turned out of wrought iron. The shaft, it is remarked, regulates the pin wheel to the amount of clothes in the washer, by playing up

ing and splitting when wet. The gasoline burner swings under the washer, where there is a flame protector, to keep the flame from being blown out. The water is heated in the washer, and the burner may be swung under the stove for making starch, heating sad irons, or for cooking and baking. The washer is sold with the gasoline stove attachment.

Portable Drilling Machine.

The accompanying illustrations represent a portable drill sometimes called Scotch drill, which is being introduced



The Columbian Washer.

and down through the small gear wheel above the lid, so that there is no shaft below the pin wheel to entangle the clothes, causing the machine to work hard. It is stated that the pin wheel will not wear out, as hot water cannot affect it; and that the bearing through the small iron gear that the shaft plays through is 2 inches long, so made as not

by O. C. Crane, No. 16 Bridge Arch, Frankfort street, New York. As shown in Fig. 1 the clamps may be fastened to a bench, beam or other object 6 inches thick, or less. The standard is held in the clamps by set screws with jibs, which is an advantage in applying the drill to the work, as they allow the standard to be moved through the

clamps without loosening the clamps from their place. The standard is

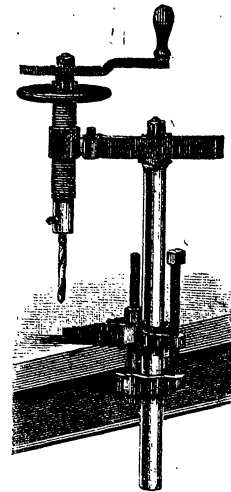


Fig. 1.—Portable Drilling Machine.

made of pipe of $1\frac{1}{2}$ inch diameter, 21 inches long, thus combining lightness

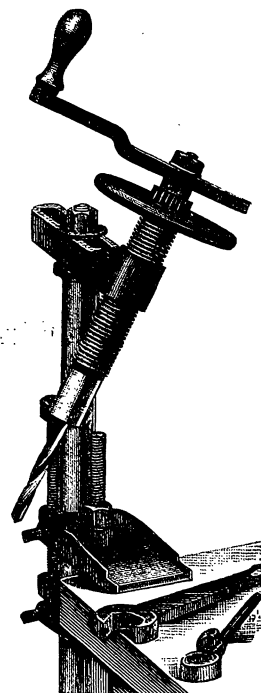


Fig. 2.—Used at an Angle.

with rigidity. The drill spindle is of steel $\frac{1}{4}$ inch in diameter, and runs in

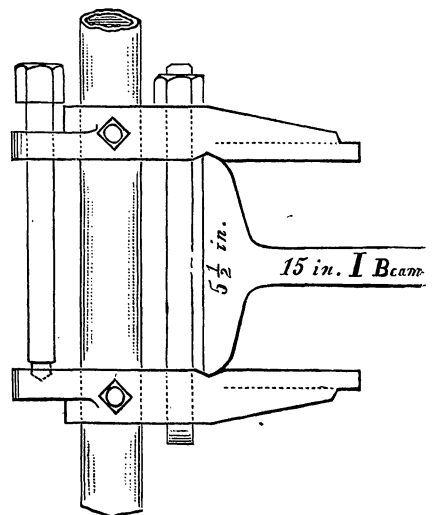


Fig. 3.—Clamped on an I-Beam.

composition bushings in each end of the feed screw. It also has a ratchet at the top supplied with a pawl wrench

which is substituted for the crank when working in contracted places where there is not room enough to swing the crank. The crank can be adjusted from $3\frac{1}{4}$ to 8 inches radius. The feed screw nut is fitted with a clasp joint, allowing the drill spindle to be turned to drill at any angle as in Fig. 2; and is threaded to prevent the feed screw nut from being lost out when the clasp is loosened. The clamps are grooved on the inside as shown in Fig. 3, to hold more securely on the edges of I beams or channel bars when drilling structural work. A triangular piece is furnished to use on the taper side of the flange when necessary. A wrench to fit all the nuts and screws is furnished with each machine; all the parts of which are of steel or wrought iron, the total weight of the machine being 29 pounds. The manufacturer claims that the machine is capable of drilling a $\frac{1}{4}$ hole $3\frac{1}{4}$ inches deep, at any angle within a radius of 9 inches. The point is made that the advantage of a portable drilling machine that is both light and strong, and easily applied, is apparent to every one who has had experience in machine building. A No. 2 drill is in course of preparation, of the same size as the machine herewith described, but lower in price and slightly different in construction.

Adjustable Soaking Shoe.

The accompanying cut represents Sidebotham & Sander's adjustable soaking shoe, introduced by William Sidebotham, 235 East Forty-seventh street, and T. G. Ellsworth as sales agent, 85 Chambers street, New York. The shoe consists of a metal frame which is adjustable to fit different sized feet, and is held on the foot by straps and buckles. The object of the soaking shoe is to apply moisture at night while the animal is at rest, by placing a sponge filled with water in the chamber

stead of standing the feet in water during the day, when the feet have become hard, dry and brittle from traveling on pavements, producing corns, quarter

putting a keg into the holder the holder is tipped down in front and the keg put in place, after which the head is knocked in, making a nail bin out of the keg.

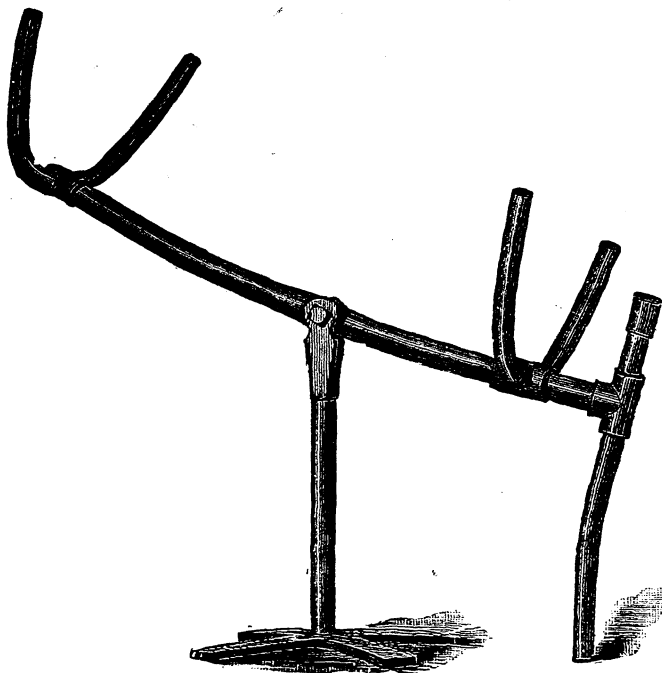


Fig. 1.—Jones' Nail-Keg Holder.

cracks, contracted hoofs, &c. The point is made that the shoe is cheap, durable, simple and clean and that it does not interfere with the horse's work or rest.

Jones' Nail Keg Holder.

The Orophelian Mfg. Co., Petaluma, Cal., are introducing the nail-keg holder

When nails are required the holder is tipped forward with the scoop under the front of the keg and the nails drawn out with the nail claw. It is claimed that by the use of the holder no nails



Adjustable Soaking Shoe.

of the shoe, thus applying the moisture where it is required. The shoe is to apply moisture to the foot at night in-

shown in Figs. 1 and 2. The holder is referred to as being made of first-class material, and as strong and durable. In

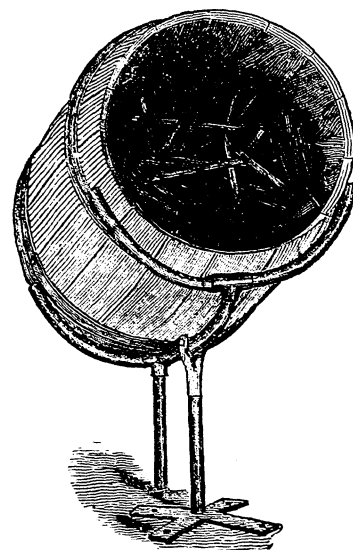


Fig. 2.—Keg in Holder.

are left on the floor, hands are not injured in filling a bin, and that time and money are saved, as well as annoyance.

A COMPLIMENTARY NOTICE of Charles Fach appears in a recent number of the St. Louis *Critic* in connection with his likeness. Mr. Fach is a native of St. Louis, and his connections in the Hardware business, which he entered upon leaving school, have been with Julius Morisse, G. Bremermann & Co. and A. F. Shapleigh Hardware Company, with which firm he is associated as salesman and stockholder at the present time.

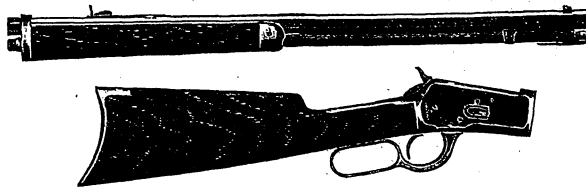
Ball-Bearing Wringer.

The accompanying illustrations represent a ball-bearing wringer put on the market by the Peerless Mfg. Company, Cleveland, Ohio. The ball bearings are shown in Fig. 2, and their arrangement is described as follows: Four ball-bearing cones are placed in the wood frame, the cones having a perpendicular movement but are horizontally held firm, on the inside by a projection in the frame and on the outside by adjustable cones screwed on to the shaft, which also take up all wear that might occur to the cones or bearing cases. The cones, it is stated, fit snugly inside the bearing cases, and the cases themselves are close down to the main shaft; also that a drop of oil applied to each bearing either before or just after using the machine is all that is required to keep the bearings in proper condition. The cones and bearing cases are referred to as being of steel, hardened and tempered, and the balls

malleable iron clamps and other features which, it is remarked, are new and valuable.

The Winchester Model 1892 "Take Down" Rifle.

The Winchester Repeating Arms Company, New Haven, Conn., and 312



The Winchester Model 1892 "Take-Down" Rifle.

Broadway, New York, are putting their 1892 model "take down" rifle on the

which leaves the stock and action in one piece, the barrel and all the parts attached in another, so that the gun can be conveniently carried in a Victoria case, like a shotgun. The magazine can be screwed out and withdrawn entirely from the barrel, leaving the barrel in condition to be washed with water, if desired, without wetting the action or the magazine. The gun may

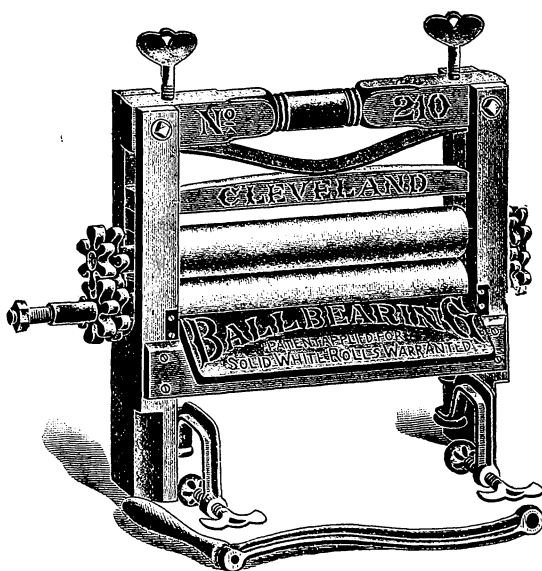


Fig. 1.—Ball-Bearing Wringer.

as bicycle balls manufactured by the market, as illustrated herewith. The Simonds Rolling Machine Company. The barrel of the gun is attached to the frame by an interrupted screw so that

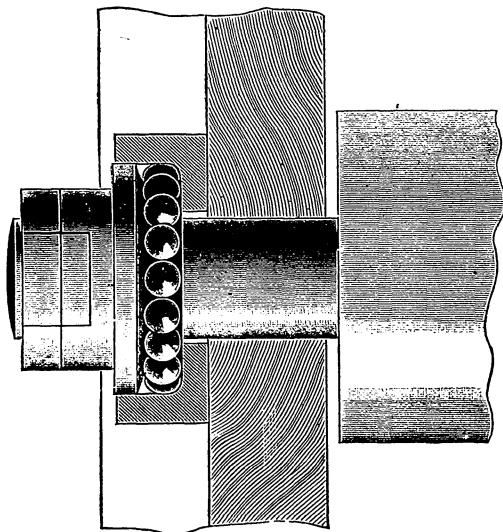


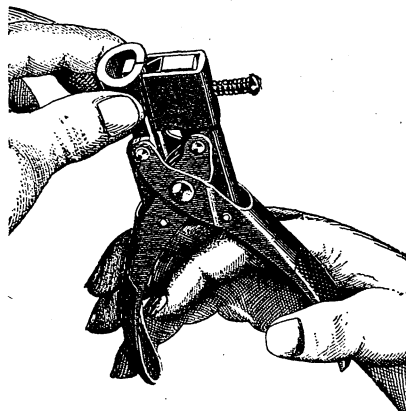
Fig. 2.—Arrangement of Ball Bearings.

wringer will do the work with little labor and with little wear and tear, and that it runs so easily a child can operate it. The wringer has a steel spring,

one-quarter turn will detach the barrel from the frame. The magazine, barrel and fore-end are attached by a ring at the breech, so as to form but one piece,

Leather Loop Plier.

The Wm. Schollhorn Company, New Haven, Conn., for whom Julius Berbecker & Co., 65 Duane street, New York, are agents, are introducing a plier for making slide loops as illustrated herewith. A metallic fastener with two tongs or points on each side is used in connection with the plier. The plier has parallel jaws, so that the pressure is brought to bear evenly upon the entire length of the loop, and the inside of the lower jaw is provided with two circular parallel grooves, running lengthwise of the jaw. On the upper jaw is a hood



Leather Loop Plier.

held in place by a screw on which is a spiral spring. In operation the plier is opened full width, the fastener shoved back into the hood with the points down, the leather loop is pressed together until its ends are brought together, held in this position and slipped onto the lower jaw, with the ends at the center of the jaw. As the plier is then pressed together, the four tongs of the fastener are driven through the leather and strike the lower jaw just at the outside edges of the two parallel circular grooves, and, under continued pressure of the plier, the four points of the fastener are all turned in toward each other, and are clinched into the loop, thus obviating the necessity of any sewing. The manufacturers claim that the plier does the work like a machine, correctly, uniformly, quickly, cheaply and substantially.

Current Hardware Prices.

SEPTEMBER 27, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic \$ doz \$3.00, 88% @ 33% & 10%
Excelsior \$ doz \$10.00, 50&10&2%
North's \$ doz \$11.00, 11&11%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Eagle Anvil, 5 lb. D 9% 15&15%
Peter Wright's 11&11%
Armstrong's Mouse Hole 10%
Am. Wrought Horse shoe brand, 11&11%
Trenton 10%
Wilkinson's 10%
Moore & Barnes Mfg. Co. 33%&5%

Anvil Vise and Drill—

Millers Falls Co., \$18.00 20%
Cheney Anvil and Vise 25%
Allen Anvil and Vise \$3.00 40&10%
Star 45&5%

Apple Parers—See Parers. Apple, &c.

Augers and Bits—

Common Augers and Bits 70&70%
Boring Machine Augers 70&70%
Car Bits, 12-in. twist 50%
Russell Jennings' Augers and Bits 25&10%
Jennings' Pattern Car Bits 40%
Jennings' Pattern Auger Bits 60%
Sael's Bits 60&5%
C. E. Jennings & Co., No. 10, extension 40%
C. E. Jennings & Co., No. 30 60%
C. E. Jennings & Co. Auger Bits, set, 32% quaters, No. 5, \$5; No. 30, \$3.50, 25%
Lewis' Patent Single twist 45%
Pugh's Black 20%
Pugh's Jennings Pattern 30%
L'dommedieu Car Bits 15&10%
Forstner Pat. Auger Bits 30%
Cincinnati Bell-Hangers' Bits 30&10

Bit Stock Drills—

Morse Twist Drills 50&10&5%
Standard 50&10&5%
Cleveland 50&10&5%
Syracuse, for metal 50&10%
Syracuse, for wood (wood list) 30&10&5%
Cincinnati, for wood 30&10%
Cincinnati, for metal 45&10%

Expansive Bits—

Clark's small, \$18; large, \$26. 35&35%
Ives' No. 4, \$ doz \$60 40%
Swan's 30&10%
Steer's, No. 1, \$28; No. 2, \$18. 35&40%
Stearns' No. 2, \$48 20%

Gimlet Bits—

Common \$ gross \$2.75 @ \$3.25
Diamond \$ doz \$1.25, 40&10%
Bee 25&25&5%
Double Cut 25&25&5%
Shepardson's 45&45&10%
Ct. Valley Mfg. Co. 30&10%
Hartwell's \$ gro. \$10.00, 40&10%
Douglass' 40&10%
Ives' 60&60&10%

Hollow Augers—

Ives' 83% @ 33%
French, Swift & Co. (Beecher) 8%
Douglass' 40%
Donney's Adjustable, \$ doz \$48 50%
Stearns' 20&10%
Ives' Expansive, each \$4.50 50&5%
Universal Expansive, each \$4.50 20%
Wood's 25&25&10%
Cincinnati Adjustable 25&10%
Cincinnati Standard 25&10%

Ship Augers and Bits—

L'Hommiedieu's 15&10@15&10&5%
Watrous' 25&25&10%
Snell's 25&25&10%
Snell's Ship Auger Pat'n Car Bits 15&10@15&10&5%

Awl Hafts—See Hafts, Awl.

Awls—

Awls, Sewing, Common, \$ gr. 85¢ @ 90¢
Awls, Should, Peg, \$ gr. \$1.50 @ \$1.55
Awls, Pat. Peg, \$ gr. 85¢ @ 88¢
Awls, Shouldered Brad, \$ gr. \$1.30 @ \$1.40
Awls, Handled Brad, \$ gr. \$2.50 @ \$3.00
Awls, Handled Scratch, \$ gr. \$4.00 @ \$4.50
Awls, Socket Scratch, \$ doz. \$1.10 @ \$1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First quality, best brands, \$7.00 \$7.50
First qual., other brands 6.50
Second quality 5.50, 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1, 34¢ @ 44¢, No. 2, 54¢ @ 64¢
Nos. 7 to 14 3% cash
Nos. 15 to 28 47%
Nos. 19 to 22 70%
Concord Axles, loose collar 4% @ 6%
Concord Axles, solid collar 5% @ 7%
National Tubular Self Oiling 33% @ 5%
See also Machines, Hotrolling.

Bag Holders—See Holders, Bag.

Balances—

Spring Balances 40%
No. 2000 20 30
Chatillon, \$ doz. \$0.80 0.95 1.75 net
Chatillon Straight Balances 40%
Chatillon Circular Balances 50&10%

Barb Wire—See Wire, Barb.

Bars—

Crow \$ D 3%
Iron, Steel Points \$ D 3%

Basins, Wash—

Standard Fiberglass, No. 1, 10% in., \$1.80;
12-inch, \$2.00; 13% inch, \$2.50; 15-inch, \$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82. 50&10%
Chatillon's No. 1 50&10%
Chatillon's No. 2 50%
Custer's 33%&5%

Beaters—

Egg—
Dover \$ doz \$1.00 @ \$1.20
Duplex (Standard Co.) \$ doz \$1.00
Dover (Standard Co.) \$ doz \$1.00
Duplex Extra Heavy (Standard Co.) \$ doz \$3.50
Bryant's \$ gross \$14.00
Double (H. & R. Mfg. Co.) \$ gro. No. 0
\$12.00; No. 1, \$15.00; No. 2 \$38.00
Easy (H. & R. Mfg. Co.) \$ gro \$12.00
Triple (H. & R. Mfg. Co.) \$ gro \$16.50
Spiral \$ gro \$4.25 @ \$4.50
Improved Acme (H. & R. Mfg. Co.) \$ gro \$9.00
Silver & Co. \$ doz \$5.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2 20%

Bells—

Cow—
Common Wrought 60&10%
Western, Sargent's list 70&10%
Kentucky, "Star" 20&10%
Kentucky, Sargent's list 70&10%
Kentucky Durham 70&10%
Dodge, Genuine Kentucky 70&10%
Texas Star 50&10@50&10&5%

Door—

Gong, Abbe's 33% @ 10%
Gong, Yankee 45&10%
Crank, Brooks' 50&10&5%
Crank, Cone's 10%
Crank, Connel's 20&10%
Lever, Sargent's 60&10%
Lever, Taylor's Bronzed or Plated net
Lever, Taylor's Japanese 75&10%
Gong, Barton's 50&10&5%
Pull, Brook's 50&10&5%

Electric—

Wollensak's 20%
Bigelow & Dowse 20%

Hand—

Light Brass 70&10@70&10&5%
Extra Heavy 70%
White 70%
Silver Chime 33% @ 10%
Globe Chime's Patent 25&10@35%

Miscellaneous—

Call 45&50%
Farm Bells \$ D 3% @ 3%
Steel Alloy Church and School Bells 40%
Blacksmiths' 60&10&5@60&10&10%
Molders' 40&10@50%
Hand Bellows 40&10@50%

Beltting, Rubber—

Common Standard 75&75&10%
Standard 60&10@60&10&10%
Extra 60&10@60&10&10%
N.Y.B.&P. Co., Carbon 60&60&5%
N.Y.B.&P. Co., Diamond 60&60&5%
N.Y.B.&P. Co., Para 40&40&5%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters 15%
Detroit Perfected Tire Bender 15%
Green River Tire Benders and Upsetters 20%

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron, 6" @ 6" @ 10%
Cleveland Block Co., Novelty, Mal. Iron 50%
Sure Grip Steel Tackle Block 55%
See also Machines, Hotrolling.

Bolts—

Carriage, Machine, &c.—

Com. list June 10, '84 80&80&5%
Genuine Eagle, Norway, list Oct. '84 80&5@80&10%
Eagle, Norway, list Oct. '84 80&5@80&10%
Philadelphia, list Oct. 7, '84 80%
R.B. & W., old list 70%
Machine, list Jan. 1, 1890 80&10%
Bolt Ends, list Jan. 1, 1890 80&10%

Door and Shutter—

Cast Iron Barrel, Square, &c. 70&10%
Cast Iron Shutter, Bolt 70&10%
Cast Iron Chain (Sargent's list) 65&10%
Ives' Patent Door Bolts, 60&10@60&10&5%
Wrought Barrel 70&10@75%
Wrought Square 70&10@75%
Wrt Shutter, all Iron, Stanley's 60&10@60&10&10%
Wrt Shutter, Brass Knob 50&50&5%
Wrt Shutter, Sargent's list 60&10%
Wrt Sunk Flush, Sargent's list 60&10%
Wrt Sunk Flush, Stanley's list, 50&10&5%
Wrt B. K. Flush, Common 55&10%

Stove and Plow—

Stove 60&10@60&10&10%
Plow 60&10&50@60&10&10%
R. B. & W., Plow 55%

Tire—

Common, list Feb. 28, '83 65&65&5%
Port Chester Bolt and Nut Company:
Empire list Feb. 28, '83 65%
Keystone, Philadelphia, list Oct. '84 80%
Norway, Phila., list Oct. '84 75%
American Screw Company
Norway, Phila., list Oct. 16, '84 75%
Eagle, Phila., list Oct. 16, '84 80%
Philadelphia, list Oct. 16, '84 80%
Bay State, list Feb. 28, '83 65%
R. B. & W., Philadelphia, list Oct. 16, '84 80%

Borers, Tap—

Common and Ring 20&10%
Ives' Tap Borer 33% @ 5%
Enterprise Mfg. Co. 20%
Clark's 33% @ 35%

Borax—

Per D 9% @ 10%
Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per D 2%
Boxes, Miter.

Spilker's Excelsior, 3 in. \$7.50, 4 in. \$8.50, 5 in. \$13.00, 6 in. \$15.00 20%
Braces—
American Bit Brace and Tool Co. 60&10%
Nos. 10, 12, 20 60&10%
Nos. 11, 21, 24, 27 70&10%
Nos. 22, 23, 25 60&10&5%
Nos. 13, 26, 36, 37 70&10&5%

Barker's Imp'd Plain 75&10@80%
Barker's Imp. Nickeled 65&10@70%
Ratchet 75&10@80%
Eclipse Ratchet 60%
Globe Jawed 40&40&10%
Corner Jawed 40&40&10%
Universal, 8 in., \$2.10; 10 in. \$2.25
Buffalo Ball \$1.10 @ \$1.15
Barber's 50&10%
Saxton's 50&10%
Barker's Imp. Polished 75&10@80%
Barker's Imp. Nickeled 65&10@70%
Ratchet, Polished 50&10@60%
Ratchet, Nickeled 40&10@50%
Buffalo Ball net, \$1.10 @ \$1.15
Bartholomew's 50&10@60&5%
Nos. 25, 27 and 30 50&10@60&5%
Nos. 117, 118, 119 70&70&5%
Common Ball, Amford \$1.00 @ \$1.10
Fray's No. 70 to 120, 81 to 123, 207 to 414 50&10%
Ives' New Haven Novelty 70&70&5%
New Haven Ratchet 80&5@60&10%
Barber Ratchet 60&5@60&10%
Barber's 60&5%
Sporford 60&5@60&10%
P. S. & W. Co., Peck's Patent 60%
Rose & Johnson 50%
Davis Patent 50&10%

Brackets—

Shelf, plain 85&70%
Regular, list 60&10@70&10%
Sargent's list 70&70&10%
Other makes at a wide range of prices.
Bradley Shelf Brackets 70&10%

Bright Wire Goods—See Wire.

Broilers—

Hen's Self-Inch 9 10 9x11
Basting, \$ Per doz. \$4.50 5.50 6.50
New Haven 50%
Wire Goods Co. \$ doz. \$12.50
Morgan Odorous 33%
Queen City 33%
Buckets, Well—
Galvanized—
Hill's \$ doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Glad \$ doz. 14 qt. \$4.25 @ \$4.50
Helwig's Flat Iron Band \$3.75
Helwig's Wired Top \$ doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Butchers.

Butts—

Wrought Brass 80&80&10%
Cast Brass, Tiebout's 50%
Cast Brass, Fast 33% @ 10%
Cast Brass, Loose Joint 33% @ 10%

Cast Iron—

Fast Joint, Narrow 50&10&5@60%
Fast Joint, Broad 50&10@60%
Loose Joint 75&75%
Loose Joint, Japanned 10%
Loose Joint, Jap. with Acorns 75&75%
Mayer's Hinges 75&75%
Loose Pin, Acorns 10%
Loose Pin, Acorns, Japanned 75&75%
Loose Pin, Acorns, Japanned, Plated Tips 50&10&5@60%

Wrought Steel

Fast Joint, Narrow 50&10&5@60%
Fast Joint, Lt. Narrow 50&10@60%
Fast Joint, Broad 50&10@60%
Loose Joint, Broad 50&10@60%
Table Butts, Back Flaps, &c. 50&10@60%
Inside Blind, Regular 50&10@60%
Inside Blind, Light 50&10@60%
Loose Pin 50&10@60%
Bronzed Wrought Butts 50&10&5@60%

Cages, Bird—

Hendryx, Brass or Enameled 50&10%
Hendryx, Wood 40&10%

Calipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt 54¢ @ 6¢
Burke's One Prong, Blunt 54¢ @ 6¢
Burke's, Two Prong, Blunt 74¢ @ 8¢
Burke's, One Prong, Sharp 64¢ @ 7¢

Can Openers—See Openers.

Cans, Milk—

S. S. & Co.: 5-gal., \$3.00; 8-gal., \$4.40;
10-gal., \$4.75 each 40&10%

Cans, Oil—

Galvanized Blue Band, 5 gal., Tip-Top, \$ doz. \$12.00
Galvanized Blue Band, 5 gal., Faucet, \$ doz. \$8.00
Galvanized Blue Band, 1 gal., \$ doz. \$2.25
Glass Oil, Friend \$ doz. \$2.75

Caps—

Hicks & Goldmark's and Union Metallic Cartridge Co. \$ 1000
F. L. Waterproof, 1-10's 35¢ @ 37¢
E. B. Trimmed Edge, 1-10's 47¢ @ 50¢
E. B. Grnd. Edge, Cent. Fire, 1-10's 47¢ @ 50¢

Musket, Waterproof, 1-10's—

G. D. 27¢ @ 30¢
S. B. Genuine Imported 45¢
Eley's E. B. 56¢ @ 58¢
Eley's D Waterproof, Central Fire. \$1.60

Primers—

Berdan Primers, \$1.00 2%
B. L. Caps (Sturtevant Shells) \$1.00 2%
All other Primers, \$1.20 2%

Cards—

Watson's Cotton, Wool, Horse and File, list January 28, 1891. 25%

Carpet Stretchers—

See Stretchers, Carpet.
Cartridges—
Rim Fire Cartridges 50&5&2%
Rim Fire Military 15&2%
Cent. Fire, Pistol and Rifle 25&5&2%
Cent. Fire, Military and Sporting 15&5&2%

Blank Cartridges, except 22 and 32 cal., additional 10% to above discounts.
Blank Cartridges, 22 cal., \$1.75 2%
Blank Cartridges, 32 cal., \$3.50 2%
Primed Shells and Bullets 15&5&2%
B. B. Caps, Round Ball, \$1.75 2%
B. B. Caps, Con. Ball, Swgd., \$2.00 2%

Carpet Sweepers—

See Sweepers, Carpet.
Casters—
Bed 55&55&10%
Plate 60&60&10%
Shallow Socket 40&10%
Deep Socket 40&10%
Martin's Patent (Phoenix) 45&10@50&13%
Tucker's Patent, low list 45%
Payson's Anti-friction 70&70&10%
Payson's Truck 60&60&10%
Yale Casters, low list 45%
Yale, Gem 70%
Giant Truck Casters 55%
Stationary Truck Casters 50&10%
Socket Truck Casters 50&50&10%
Gwinner's Common Sense 45%
Gwinner's Hercules 45%

Cattle Leaders—

See Leaders, Cattle.
Cement—
Victor Elastic 5 D pails \$ D 5¢
Chain—
Trace Wagon and Fancy Chains. List revised May, 1893. 60&60&10%
American Coll, in cask lots, 3-16 3-16 5-16 7-16 1-1 5¢ @ 3.25
\$7.60 5.30 4.45 3.80 3.85 3.50 3.40 3.25
Less than cask lots, add 1%
German Coll, list July 12, 1892 6¢ @ 60&10%
German Halter Chain, list July 12, 1892. 60¢ @ 60&10%
Covert Halter 60&2%
Cover Traces 35&2%
Cover or Heel Chain 50&2%
Galvanized Pump Chain. 5 ton lots \$ 100 @ \$5.50
1 ton lots \$ 100 @ \$5.75
500 lb lots \$ 100 @ \$5.75
Less than 500 lb \$ 100 @ \$7.00
Oneda Halter chain 60¢ @ 60&5%
Jack Chain, Iron and Brass, list July 10, 1893. 8¢ @ 10%
Barnes Reinforced Sash 60&10%
Barnes Victor Sash 55¢

Chalk—

See also Crayons.
White, case lots, \$ gr 50¢; small lots, 52¢
Red, case lots, \$ gr 67¢; small lots, 72¢
Blue, case lots, \$ gr 75¢; small lots 80¢

Chalk Lines—See Lines.**Cracks, Door—**

| | |
|---------------------------|----------------------|
| Unity |50% |
| Chisels— | |
| Socket Framing and Firmer | |
| P. S. & W. |75%10@75%10@10% |
| New Haven |75%10@75%10@10% |
| Witherby |75%10@75%10@10% |
| Mix |75%10@75%10@10% |
| Ohio Tool Co. |75%10@75%10@10% |
| Douglas |75%10@75%10@10% |
| Buck Bros |75%10@75%10@10% |
| Merrill |60%10@60%10@10% |
| L. & J. J. White |80%30@85% |

| | |
|----------------------------------|-----------------------|
| Tanged and Miscellaneous. | |
| Tanged Firmers |50%50%10% |
| Butchers |\$4.75@5.00 to 2 |
| Spears & Jacksons |\$5 to 2 |
| Buck Bros |30% |
| Cold Chisels, fair quality, # 1 |14@16% |

Chucks—

| | |
|----------------------------------|----------------------------|
| Beach Pat |each, \$8.00.....20% |
| Morse's Adjustable, each, \$7.00 |20% |
| Danbury |each, \$6.00 30@30%5% |
| Syracuse, Balz Pat. |25% |
| Graham Patent |33%1/2 |
| Skinner's Patent Chucks |33%1/2 |
| Combination Lathe Chucks |33%1/2 |
| Universal Lathe Chucks |40% |
| Independent Lathe Chucks |40% |
| Drill Chucks |15% |
| Union Mfg. Co. | |
| Victor |\$8.50, 25% |
| Combination |40% |
| Universal |40% |
| Independent |40% |

Churns—

| | |
|---|---|
| Tiffin Union, each, 5 gal. \$3.25; 7 gal. |\$3.75; 10 gal, \$4.25. |
| McDermaid Star Barrel Churn, each |6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25. |

Clamps—

| | |
|---------------------------------------|---------------------|
| R. I. Tool Co.'s Wrought Iron |25% |
| Adjustable, Cincinnati |15%10% |
| Adjustable, Hammers |15%15%5% |
| Adjustable, Stearns |30@30%10% |
| Stearns's Adjustable Cabinet and Cor- |ner |
| Cabinet, Sargent's |70%10% |
| Carriage Makers, Sargent's |75%75%5% |
| Carriage Makers, P. S. & W. Co. |40%10% |
| Eberhard Mfg. Co. |40%5@40%10% |
| Warner's |40%10@40%10%5% |
| Saw Clamps, see Uses, Saw Filers | |
| Carpenter's, Cincinnati |25%10% |
| Barnes' Machinists' Clamps |33%1/2 |

Cleavers, Butchers

| | |
|---------------------------|--------------------|
| Bradley's |25%80% |
| L. & J. J. White |20% |
| Beatty's |40%40%5% |
| New Haven Edge Tool Co.'s |40% |
| P. S. & W. |33%5@33%5@10% |
| Poster Bros. |30% |
| Schulte, Lohoff & Co. |40%40%5% |

Clips—

| | |
|----------------------------------|---------------------|
| Norway, Axle, 1/4 & 5-16 |55%5%5% |
| 2d grade Norway Axle, 1/4 & 5-16 |65%5% |
| Superior Axle Clips |60%5%10% |
| Norway Spring Bar Clips |5-16, 60%5%10% |
| Wrought Iron Felloe Clips |# 1, 5-16, 5% |
| Steel Felloe Clips |# 1, 5-16, 5% |
| Baker Axle Clips |25% |

Cloth and Netting, Wire

—See Wire, &c.

Cockeyes—

| | |
|---------------|------------|
| Hardware list |60%2% |
|---------------|------------|

Coffee Mills—See Mills, Coffee.**Collars Dog—**

| | |
|---------------------------------------|----------------|
| Chapman Mfg. Company, new list |40% |
| Medford Fancy Goods Co. |40%10@50% |
| Embossed, Gift, Pope & Stevens's list |30%5% |

Combs, Curry—

| | |
|----------------------------|----------------------|
| Fitch's |50%10@50%10@10% |
| Rubber, per doz., \$10.00 |25% |
| American Curry Comb Co. |33%1/2@40% |
| Kohler's Magic Oscillating |# doz., \$2.00 |
| Kohler's Humane |# doz., \$1.75 |

Compasses, Dividers, &c.

| | |
|--|-------------|
| Compasses, Calipers, Dividers, 70@70%10% | |
| Bemis & Co. |65% |
| Dividers |65% |
| Compasses |65% |
| Calipers, Inside or Outside |65% |
| Calipers, Wing |65% |
| Calipers, Double |65% |
| Calipers, Call's Patent Inside |65% |
| Excelsior |50% |
| Stevens & Co.'s |25%10% |
| Starrett's |25%10% |
| Spring Calipers and Dividers |25%10% |
| Lock Calipers and Dividers |25% |
| Combination Dividers |25% |

Coolers, Water

| | |
|--------------------------------------|---|
| S. S. & Co., 2 gal., 3 gal., \$2.50; |4 gal., \$2.75; 6 gal., \$3.40 each.....33%1/2 |
|--------------------------------------|---|

Coopers' Tools—

See Tools, Coopers'.

Cord—

| | |
|-------------------------------------|----------------------|
| Sash— | |
| Common |# 1, 8 1/2@9% |
| White, good quality |# 1, 10@11% |
| Patent Cotton Braided, fair |# 1, 23@24% |
| Common Russia Sash |# 1, 12%1/2@13% |
| Patent Russia Sash |# 1, 13%1/2@14% |
| Cable Laid Sash |# 1, 10%1/2@11% |
| India Cable Laid Sash |# 1, 11%1/2@12% |
| Silver Lake— | |
| A quality, White, 50# |25% |
| A quality, White, 65# |25% |
| B quality, White, 30# |10% |
| B quality, White, 35# |10% |
| Sylvan Spring, Extra Braided, White |32% |
| Sylvan Spring, Extra Braided, Drab |32% |
| Semper Item, Braided, White |27%25% |
| Egyptian, India Hemp, Braided |20% |
| Massachusetts, White |20% |
| Samson— | |
| Braided, White Cotton |# 1, 37% |
| Braided, Drab Cotton |# 1, 37% |
| Braided, Italian Hemp |# 1, 40% |
| Braided, Linen |# 1, 40% |
| Tate's Solid Braided— | |
| Hercules, White |# 1, 25% |
| Hercules, Drab |# 1, 25% |
| Economy, Drab |# 1, 20% |
| Economy, White |# 1, 20% |

Ossawa Mills

| | |
|-------------------------------------|----------|
| Braided, Giant, White, # 1 30# |22% |
| Braided, Giant, Drab and Fancy, # 1 |35% |

Braided, Crown White, # 1, 50#

Braided, Crown Drab and Fancy, # 1

Wire Picture—

| | |
|--------------------|------------------|
| Braided or Twisted |80%5@80%15% |
|--------------------|------------------|

Corkscrews—See Screws, Cork.**Corn Knives and Cutters**

—See Knives, Corn.

Crackers Nut—

| | |
|---------------------------------|----------|
| Table (H. & B. Mfg. Co.) |40% |
| Blake's Pattern, # doz., \$2.00 |10% |
| Turner & Seymour Mfg. Co. |50% |
| Acme |50% |
| Japanned, # gro., \$30 |50% |
| Nickel Plated, # gro., \$30 |10% |

Cradles—

| | |
|-------|-------------------|
| Grain |50%2@50%5%2% |
|-------|-------------------|

Crayons—

| | |
|----------------------------------|-----------|
| White Crayons, # gross |7@8% |
| D. M. Stewart Mfg. Co. |25% |
| Metal Workers, # gross, \$1.75 |25% |
| Rolling Mill, # gross, 2.50 |25% |
| Railroad, # gross, 2.00 |25% |
| Soapstone Pencils, # gross, 1.00 |25% |
| See also Chalk. | |

Creamery Pails—See Pails, Creamery.**Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

Curtain Pins—

See Pins, Curtain.

Cutters—**Meat—**

| | |
|---------------------------------------|--|
| Dixon's, # doz. |40@40%5% |
| Nos. 1, 2, 3, 4 |12 22 32 42 |
| Woodruff's, # doz. |\$14.00 \$17.00 \$19.00 \$30.00 |
| Nos. |100 150 |
| Hale's, # doz. |\$15.00 \$18.00 |
| Nos. |11 12 13 |
| American |\$27.00 \$33.00 \$45.00 |
| Nos. |1 2 3 4 B 5 |
| Each |\$5 \$7 \$10 \$25 \$50 \$80 |
| Enterprise |25% |
| Each |\$3 \$2.50 \$4 \$5 \$15 |
| Little Giant, # doz. |40%1@50% |
| Nos. 305 310 312 320 322 |\$35.00 \$48.00 \$44.00 \$72.00 \$68.00 |
| Triumph No. 505, # doz. |\$21.00, 25@30% |
| Miles' Challenge, # doz. |45%45%10% |
| Nos. |\$22.00 \$30.00 \$40.00 |
| Home No. 1, # doz., \$26.00 |55%10% |
| Draw Cut, each: | |
| Nos. 5 2 6 8 |\$50 \$75 \$80 \$225.....20@25% |
| Beef Shavers (Enterprise) |20% |
| Chadborn's Smoked Beef Cutter, # doz. |\$68.00 |

Slaw and Kraut—

| | |
|--------------------------------|--------------|
| Tucker & Dorsey Mfg. Co. | |
| Slaw Cutters, 1 Knife, # gross |\$21.00 |
| Slaw Cutters, 2 Knife, # gross |30.00 |
| Kraut Cutters |40% |

Tobacco—

| | |
|---------------------------|------------------------------|
| Champion |20%10@30% |
| Nashua Look Co.'s, # doz. |\$18.00, 50%5% |
| Wilson's |55% |
| Sargent's |# doz., \$24.00, 55%10% |
| Acme |# doz., \$20.00, 40% |

Washer—

| | |
|---------------------------------------|---------------------------------|
| Smith's Pat. |# doz., \$12.00, 20%10@10% |
| Johnson's |# doz., \$11.00, 33%1/2 |
| Penny's, # doz., Pol. \$14; Imp. \$16 |65% |
| Appleton's |# doz., \$18.00, 60%10% |
| Bonney's |30%10% |
| Cincinnati |25%10% |

Diggers, Post Hole, &c.—

| | |
|--|----------------------------|
| Samson, # doz. |\$34.00.....25%25%10% |
| Fletcher Post Hole Augers, # doz. |\$36.00 |
| Eureka Diggers |# doz., \$12.00@13.00 |
| Vaughan's Post Hole Auger, # doz. |\$8.50@9.50 |
| Kohler's Little Giant |# doz., \$18.00 |
| Kohler's Hercules |# doz., \$14.00 |
| Kohler's Invincible |# doz., \$12.00 |
| Kohler's New Champion |# doz., \$8.00 |
| Scheider |# doz., \$18.00 |
| Cronk's Post Bars, # doz. |\$80.00 |
| Gibbs' Post Hole Digger |# doz., \$15.00 |
| Gibbs' National |# doz., \$12.00 |
| Gibbs' Columbia |# doz., \$13.00 |
| Gibbs' Imperial |# doz., \$7.50 |
| Shimer's Hollow Handle |# doz., \$24.00 |
| Gem, Improved # doz., \$9.00@10.00 net |50% |

Dividers—See Compasses.**Dog Collars—See Collars, Dog.****Door Checks—**

See Checks, Door.

Door Springs—

See Springs, Door.

Drawers.

| | |
|----------------------------|--------------|
| Money, # doz. |\$18@20 |
| Waddell's Improved, # doz. |\$15.00 |

Drawing Knives—

See Knives, Drawing.

Drills and Drill Stocks—

| | |
|--------------------------------|-----------------------|
| Blacksmiths' Self Feeding |each, \$1.75 |
| Blacksmiths' Self Feeding |each, \$7.50 20% |
| Breast, P. S. & W. |40%10% |
| Breast, Wilson's |30%5% |
| Breast, Millers Falls |each \$3.00, 25% |
| Breast, Bartholomew's |each \$2.50 |
| Ratchet, Merrill's |25%10@40% |
| Ratchet, Ingersoll's |20%20% |
| Ratchet, Parkers |20%20%5% |
| Ratchet, Whitney's |20%10% |
| Ratchet, Weston's |20%25% |
| Ratchet, Moore's Triple Action |25%30% |
| Ratchet, Curtis & Curtis |30% |
| Whitneys Hand Drill, Plain |\$11.00 |
| Adjustable |\$12.00 |
| Automatic Boring Tools |\$1.75@1.85 |
| Chicopee Automatic Drill |20%10% |
| Goodell Automatic Drills |40%5% |

Twist Drills—

| | |
|--------------------------|----------------|
| Cleveland |50%10@10% |
| Diamond, # 3 |50%10@10% |
| Graham Pat. Groove Shank |50%10@10% |
| Morse |50%10@10% |
| New Process |50%10@10% |
| Standard |50%10@10% |
| Syracuse (Metal list) |50%10% |

Drill Bits or Bit Stock

Drills—See Augers and Bits.

Drill Chucks—See Chucks.**Dripping Pans—**

See Pans, Dripping.

Drivers, Screw—

| | |
|-------------------------------|---------------------|
| Douglas Mfg. Co. |30@20%10% |
| Disston's |50% |
| Buck Bros |30% |
| Stanley R. & L. Co.'s | |
| No. 64, Varnished Handles |65%10% |
| No. 86 |70%10% |
| Sargent & Co.'s | |
| No. 1, Forged Blade |60%10@10% |
| Nos. 20, 40 and 60 |60%10@10% |
| P. S. & W. |70% |
| Knapp & Cowles | |
| No. 1 |60%20@70% |
| No. 2 |60%10@10@70%5% |
| No. 3 |60%5@60%10% |
| Nos. 4 and 60, Acme and Ideal |60%5@ |

Stearns's

| | |
|-----------------------------|---------------------|
| Gay & Parsons |35% |
| Champion |25%10% |
| Clark's Pat. |30@33%1/2 |
| Elrich's Socket and Ratchet |25@25%10% |
| Elrich's Spiral, new list |25% |
| Kolb's Common Sense |# doz., 25%10% |

Syracuse Screw-Driver Bits

| | |
|-----------------------------------|--------------------------|
| Screw Driver Bits |# doz., 50@75% |
| Screw Driver Bits, Parr's |# gross, \$6.25 |
| Fray's Hol. H. die Sets |No. 3, \$12.00, 45% |
| Cincinnati |25%10% |
| Brace Screw Drivers |25%10% |
| Buck Bros' Screw Driver Bits |27%1/2 |
| Goodell's Automatic |50% |
| Mayhew's Black Handle |50% |
| Mayhew's Monarch |45%10% |
| C. T. Williamson Wire Novelty Co. |50% |

Egg Beaters—See Beaters, Egg**Egg Poachers—**

See Poachers, Egg.

Electric Bell Sets—

See Bells, Electric.

Emery—No. 4 to No. 54 to Flour, CF.

| | | |
|-----------------|------------|----------|
| 46 gr. | 150 gr. | F. F. F. |
| Kegs, # 1 |4 1/2 | 5 1/2 |
| 1/2 kegs, # 1 |4 1/2 | 5 1/2 |
| 10-# cans, 10 |5 1/2 | 5 1/2 |
| in case |6 1/2 | 6 1/2 |
| 10-# cans, less |10 | 7 1/2 |
| than 10-# |10 | 7 1/2 |

Enameled and Tinned

Ware—See Ware, Hollow

Escutcheon Pins—

See Pins, Escutcheon.

Escutcheons—

| | |
|------------------------------------|----------------|
| Door Lock, Same dis. as Door Locks | |
| Brass Thread |60%60%10% |
| Wood |25% |

Expanded Metal—

| | |
|-------------------------|----------|
| List No. 5 | |
| Lathing |10% |
| Fencing, Painted Sheets |20% |
| Netting, Painted Sheets |20% |
| Door Mats, Galvanized |25% |
| Window Guards, Paneled |15% |
| Tree Guards, Paneled |15% |

Extractors, Lemon Juice—

See Squeezers, Lemon.

Fasteners, Blind—

| | |
|----------------------------------|--------------------|
| Mackrell's, # doz., \$1.00 |20@20%10% |
| Van Sand's Screw Pat, \$15 # gr. |60%10% |
| Van Sand's Old Pat, \$15 # gr. |55%10% |
| Austin Eddy No. 208 |# gr., \$9.00 |
| Security Gravity |# gr., \$9.00 |
| Zimmerman's |50%10% |

Faucets—

| | |
|------------------------|-------------|
| Fenn's |40% |
| Fenn's Cork Stops |33%1/2 |
| Star |60% |
| Frary's Pat. Petroleum |60% |

urgency concerning it, it is not clear

| | |
|---|--|
| Britain, Graham & Mathes, list Jan. 1890 | 60%10%10% |
| Plate | 38%42% |
| Barnes Mfg. Co. | 40%40%10% |
| Yale | net prices |
| Deltz | 38% |
| Romer's Night Latches | 50% |
| Brooklyn Latches | 50%10% |
| Warner's Burglar Proof | 50% doz. \$3.00, 50% |
| Elevator— | |
| Moore's | 39%4% |
| Padlocks— | |
| List June 10, 1891 | 50%2% |
| Norwich Lock Mfg. Co., old list | 50%2% |
| Yale Lock Mfg. Co.'s | net prices |
| Eagle | 40% |
| Bureka, Eagle Lock Co. | 40%2% |
| Romer's Nos. 0 to 91 | 30% |
| Romer's Scandinavian, &c., Nos. 100 to 505 | 15% |
| A. E. Deltz | 40% |
| Champion Padlocks | 40% |
| Hotchkiss | 80% |
| Star | 80% |
| Horseshoe | 50% doz. \$9.50, 50%10% |
| Barnes Mfg. Co. | 40%40%10% |
| Noek's | 30% |
| Scandinavian | 80%40% |
| E. T. Fraim's Keystone Scandinavian | 1010 line |
| 120 line | 90%35% |
| 150 line | 70%10% |
| 225, 6 and 200 lines | 70% |
| All other numbers | 50%5% |
| Ames Sward Co. up to No. 160 | 40% |
| Ames Sward Co. above No. 160 | 50% |
| Slaymaker Barry & Co. | No. 1010 line |
| No. 41 line | 90%5% |
| No. 61 line | 80% |
| No. 21 line | 80% |
| Sash, &c.— | |
| Clark's No. 1, \$10; No. 2, \$8 gr. | 39%4% |
| Ferguson's | 39%4% |
| Victor | 60%10%2% |
| Walker's | 10% |
| Attwell Mfg. Co. | 25%39%4% |
| Reading | 60%10%2% |
| Hammond's Window Springs | 40% |
| Common Sense, Jap'd, Cop'd and Brzed | gr \$4.00 |
| Common Sense, Nickel Plated | gr \$10.00 |
| Universal | 30% |
| Kempshall's Gravity | 60% |
| Kempshall's Model | 60%10%10% |
| Corbin's Sash | list Feb. 15, 1890 |
| Payson's Perfect | 60%10%10% |
| Huginin's Sash Balances | 25%5% |
| Huginin's New Sash Locks | 25%5% |
| Ives' Patent | 60%10%5%10%10% |
| Fish (Liesche's pat.), No. 100, gr. \$3 | 60% |
| No. 105, gr. \$10 | 60% |
| Davis Bros. Barnes Mfg. Co. | 80% |
| Champion Safety list January, 1893 | 70%5% |
| Security | 70%5% |
| Giant, list Jan., 1892 | 70%5% |
| Wolf's | 60%10%5% |
| Monarch | 60% |
| Lumber Tools— | |
| See Tools, Lumber. | |
| Lustro— | |
| Four-ounce bottles | 50% doz. \$1.75; 50% gross \$17.00 |
| Machines. | |
| Boring— | |
| Without Augers | Upright, Angular. |
| Douglas | \$5.50 \$9.75 |
| Snell's, Rice's Pat. | 5.50 6.75 40%10% |
| Jennings's | 5.50 6.75 40%10% |
| Other machines | 2.35 2.75 |
| Phillips' Patent | 7.00 7.50 |
| With Auger | 7.50 |
| Miller's Falls | 7.50 |
| Boss, Carpenters' | 3.50 |
| Boss, Ship Bldrs' | 3.50 |
| Fluting— | |
| Knox, 4 1/2-inch Rolls | \$3.25 each |
| Knox, 6-inch Rolls | \$3.60 each |
| Eagle, 3 1/2-inch Rolls | \$2.15 |
| Eagle, 5 1/2-inch Rolls | \$2.35 |
| Cr-wvn, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$4.50 each | 35% |
| Cr-wvn Jewel, 6 in. | \$3.50 each |
| American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each | 35% |
| Domestic Fluter | each, \$1.50 |
| Geneva Hand Fluter, White | 50% doz \$12.25 |
| Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25 | 30% |
| Shepard Hand Fluter, No. 85, per doz | \$15.50 |
| Shepard Hand Fluter, No. 110, per doz | \$11.00 |
| Shepard Hand Fluter, No. 95, per doz | \$3.00 |
| Combined Fluter and Sad Iron | 50% doz \$15.00 |
| Holisting— | |
| Moore's Hand Holist, with Lock Brake | 20% |
| Moore's Anti-Friction Differential Pulley Block | 20% |
| Moore's Rope Differential Pulley Block | 20% |
| Energy Mfg. Co.'s | 60% |
| See also Blocks. | |
| Washing— | |
| Anthony Wayne | 50% doz. No. 1, \$42; No. 2, \$40; No. 3, \$42 |
| Wayne American | 50% doz \$36.00 |
| Western Star | 50% doz. No. 2, \$36; No. 3 \$39 |
| Weissell | 50% doz \$54.00 |
| Fair and Square | 50% doz \$42.00 |
| Mallets— | |
| Hickory | 20%10%20%10%10% |
| Lignumvitae | 20%10%20%10%10% |
| B. & L. Block Co., Hickory & L. V. | 30%30%10% |
| Mattocks—Regular list | 60%10%60%10%10% |
| Measures | |
| Standard Fireware, No. 1, peck | 50% dozen, \$3.50; 1/2 peck, \$3.00 |
| Meat Cutters— | |
| See Cutters, Meat. | |
| Menders, Harness— | |
| Per doz. | \$2.00 |
| Milk Cans—See Cans, Milk. | |

| | |
|---|--|
| Mills— | |
| Coffee— | |
| Box and Side, list Jan. 1, 1888 | 60%60%5% |
| Net prices are often made which are lower than above discount. | |
| American, Enterprise Mfg. Co., list Jan. 17, 1893 | 20% |
| The Swift, Lane Bros. | 30% |
| Waddell's New Box Mills, Ideal Brand, New List | 60% |
| Mining Knives— | |
| See Knives, Mining. | |
| Molasses Gates— | |
| See Gates, Molasses. | |
| Money Drawers— | |
| See Drawers, Money. | |
| Mowers, Lawn— | |
| Best Machines: 10-in., \$4; 12-in., \$4.50; 14-in., \$5; 16-in., \$5.50; 18-in., \$6. | |
| Low-Grade Machines: | |
| 10-in. \$3; 12-in., \$3.25 14-in. \$3.50 each | |
| Muzzles— | |
| Safety | 50% doz. \$3.00, 25% |
| Nails— | |
| Cut and Wire. See Trade Report. | |
| Wire Nails, Papered. | |
| Association list, May 1, '92 | 85%5% |
| Track Mfrs' list | 70%5%10% |
| Hungarian, Finishing, Upholsterers', &c. | See Tacks. |
| Horse— | |
| Nos. 6 7 8 9 10 | |
| American | 9% 9% 9% 9% 9% net |
| Ausable | 25% 25% 25% 25% 25% |
| Clinton, Fin. 19 | 17% 15% 14% 30%5% |
| Essex | 28% 28% 28% 28% 28% |
| Lyra | 9% 9% 9% 9% 9% net |
| Snowden | 9% 9% 9% 9% 9% net |
| Standard | 23% 21% 20% 19% 18% 35% |
| Vulcan | 23% 21% 20% 19% 18% 25% |
| Northwestern | 25% 23% 22% 21% 20% 25%25%5% |
| C. B. K. | 25% 23% 22% 21% 21% 40% |
| A. C. | 25% 23% 22% 21% 21% 40%10% |
| Maud S. | 25% 23% 22% 21% 21% 50%10%5% |
| Champlain | 28% 26% 25% 24% 23% 40%5%2% |
| Champion | 25% 23% 22% 21% 20% 10%10%10% |
| Capewell | 19% 18% 17% 16% 16% 10%5% |
| Anchor | 23% 21% 20% 19% 18% 35% |
| Western | 23% 21% 20% 19% 18% 50% |
| Empire Bronzed | 13%14% 50% |
| Picture— | |
| Brass Head, Sargent's list | 60%60%10% |
| Brass Head, Combination list | 50%10% |
| Porcelain Head, Sargent's list | 50%10%10% |
| Porcelain Head, Combination list | 40%10% |
| Niles' Patent | 40% |
| Nail Pullers—See Pullers, Nail. | |
| Nail Sets—See Sets, Nail. | |
| Nut Crackers— | |
| See Crackers, Nut. | |
| Nuts—List Dec. 18, 1889. | |
| Square, Hex. | |
| Hot Pressed | 5.80 6.50 off list |
| Alloyed | 6.10 off list |
| In packages of 100 lb. add 1-10% lb. net; in packages less than 100 lb. add 1/4% lb. net. | |
| Oakum— | |
| Best or Government | 50% 60%7%4% |
| U. S. Navy | 50% 60%7% |
| Navy | 50% 60%7% |
| Oil Tanks—See Tanks, Oil. | |
| Oilers— | |
| Zinc and Tin | 65%10%70%5% |
| Brass and Copper | 50%10%60%10%5% |
| Malleable, Hammers' Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40 | 10%10%5% |
| Malleable, Hammers' Old Pattern, same list | 45% |
| Prior's Pat. or "Paragon" Zinc | 60%10%10% |
| Prior's Pat. or "Paragon" Brass | 50% |
| Olmstead's Tin and Zinc | 60% |
| Olmstead's Brass and Copper | 50% |
| Broughton's Zinc | 60% |
| Broughton's Brass | 50% |
| Steel, Draper & Williams | 60% |
| Openers, Can— | |
| Messenger's Comet | 50% doz \$3.00, 25% |
| American | 50% gross \$2.75, 25% |
| Duplex | 50% doz 25%, 15%20% |
| Lyman's | 50% doz \$3.75, 20% |
| No. 4, French | 50% doz \$2.25, 55%60% |
| No. 6, Iron Handle | 50% doz \$6.00 45%50% |
| Eureka | 50% doz \$3.50, 10% |
| Sardine Scissors | 50% doz \$2.75, 30% |
| Star | 50% doz \$2.75 |
| Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50; 4, \$2.75 | 60%70% |
| Excelsior, No. 1 \$2.50; No. 2, \$1.50; 40% | |
| World's Best | 50% gross No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00 |
| Universal | 50% doz \$3.00 |
| Domestic | 50% doz \$2.00 |
| Champion | 50% doz \$2.00 |
| Moore's | 70% |
| Packing, Steam— | |
| Rubber— | |
| Standard, fair quality | 70%70%10% |
| Superior quality | 75%80% |
| Extra | 80%80%2% |
| N. Y. B. & P. Co., Standard | 50% |
| N. Y. B. & P. Co., Empire | 50% |
| N. Y. B. & P. Co., Salamander | 25% |
| Jenkins' Standard | 50% 25%25%5% |
| Miscellaneous— | |
| American Packing | 10%11% 50% |
| Russia Packing | 14% 50% |
| Italian Packing | 15%17% 50% |
| Cotton Packing | 15%17% 50% |
| Inta | 7%23% 50% |
| Pails— | |
| Creamery— | |
| S. S. & Co., 18-qt., \$7.00; 20-qt., \$7.25 | 50% |
| 50% doz. | 50% |

| | |
|---|---------------------------|
| Galvanized— | |
| Quarta 10 12 14 | |
| Hill's Light Weight | 50% doz. \$2.75 3.00 3.25 |
| Hill's Heavy Weight | 50% doz. 3.00 3.25 3.75 |
| Heiwig's | 2.50 2.75 3.00 |
| Sidney Shepard & Co. | 2.50 2.75 3.00 |
| Iron Clad | 2.50 2.75 3.00 |
| Buckets—See Well Buckets. | 2.75 3.25 3.50 |
| Indurated Fiber Ware | |
| Star Pails, 12 qt. | 50% doz \$4.20 |
| Milk, 14 qt. | 50% doz \$4.40 |
| Stable, 14 qt. | 50% doz \$4.00 |
| Fire Pails, deep | 50% doz \$4.40 |
| Fire Pails, round bottom | 50% doz \$4.80 |
| Standard Fiber Ware— | |
| Plain. Dec'd | |
| Water Pails, 12 qt., 50% doz. \$3.15 \$3.75 | |
| Dairy Pails, 14 qt., 50% doz. 3.75 4.25 | |
| Fire Pails, No. 1, 12 qt., 50% doz. 3.75 4.25 | |
| Sugar Pails, 14 qt., 50% doz. 4.25 5.00 | |
| Horse Pails | 5.00 6.00 |
| Buggy Pails | 3.50 |
| Slop Jars (bal. trap) | 7.50 8.50 |
| Chamber Pails, 14 qt. | 6.00 7.00 |
| Pans— | |
| Dripping— | |
| Small sizes | 50% 50% |
| Large sizes | 50% 50% |
| Silver & Co. (Covered) | 40% |
| Fry— | |
| Standard List: | |
| No. 1 | 1 2 3 4 5 6 7 8 9 10 |
| 50% doz. \$3.00 \$3.75 \$4.25 \$4.75 \$5.25 | |
| No. 2 | 5 6 7 8 9 10 |
| 50% doz. \$6.00 \$7.00 \$8.00 \$9.00 \$10.00 | |
| Polished, regular goods | 75%75%10% |
| Acme Fry Pans | 60%5% |
| Dust— | |
| Steel Edge, No. 1 | 50% doz \$1.75 |
| Roasting and Baking— | |
| Columbian, S. S. & Co., Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each | 60%10% |
| Paper and Cloth— | |
| Sand and Emery— | |
| List April 19, 1886 | 50%10%50%10%10% |
| Sibley's Emery and Crocus Cloth | 30% |
| Parers— | |
| Apple— | |
| Advance | 50% doz \$4.75 |
| Baldwin | 50% doz 5.25 |
| Bonanza | each 5.00 |
| Daisy | 50% doz 4.00 |
| Eclipse | 50% doz 4.00 |
| Eureka, 1888 | each 16.00 |
| Family Bay State | 50% doz 12.00 |
| Favorite | 50% doz 5.00 |
| Gold Medal | 50% doz 4.00 |
| Ideal | 50% doz 4.00 |
| Little Star | 50% doz 27.00, 30.00 |
| Monarch | 50% doz 4.60 |
| New Lightning | 50% doz 5.50 |
| Orlole | 50% doz 4.00 |
| Penn | 50% doz 3.00 |
| Perfection | 50% doz 4.00 |
| Potomac | 50% doz 4.00 |
| Rocking Table | 50% doz 6.00 |
| Turn Table | 50% doz 4.50 |
| Victor | 50% doz 13.50 |
| Waverly | 50% doz 4.00 |
| White Mountain | 50% doz 4.00 |
| Reading 72 | 50% doz 4.25 |
| Reading 78 | 50% doz 7.00 |
| Potato— | |
| White Mountain | 50% doz \$4.50 |
| Alum Combination | 50% doz \$5.50 |
| Hoozler | 50% doz \$3.50 |
| Saratoga | 50% doz \$5.50 |
| Pencils— | |
| Faber's Carpenters' | high list 50% |
| Faber's Round Gilt | 50% gr \$5.25 |
| Dixon's Lead | 50% gr \$4.50 |
| Dixon's Lumber | 50% gr \$6.75 |
| Dixon's Carpenters' | 10% |
| Pencils, Soapstone— | |
| See Crayons. | |
| Pickers, Fruit— | |
| Prize Fruit Pickers | 50% |
| Picks— | |
| Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00 | 60%10%50%60%10%5% |
| Picture Nails— | |
| See Nails, Picture. | |
| Pinking Irons— | |
| See Irons, Pinking. | |
| Pins— | |
| Bow— | |
| Humason, Beckley & Co.'s | 60%10% |
| Sargent & Co.'s | 50%10% |
| Peck, Stow & W. Co. | 50%10%50%10%5% |
| Curtain— | |
| Silvered Glass | net |
| White Enamel | net |
| Escutcheon— | |
| Iron, list Nov. 11, 1885 | 50%10%50%10%5% |
| Brass | 60%60%5% |
| Pipe, Wrought Iron— | |
| List April 13, 1893. | |
| 1 1/2 and under, Plain | 57%10% |
| 1 1/2 and under, Galv. | 60%10% |
| 1 1/2 and over, Plain | 67%10% |
| 1 1/2 and over, Galv. | 57%10% |
| Boiler Tubes, list Oct. 24, 1892 | 65%10% |
| Casting, list Nov. 16, 1892 | 52%4%10% |
| Inserted Joints Casting, list Nov. 16, 1892 | 47%4%5% |
| Steel Boiler Tubes | 27%4%5% |
| Cold Drawn Seamless Steel Tubing | 50% |
| Planes and Plane Irons— | |
| Wood Planes— | |
| Molding | 40%10% |
| Bench, First quality | 45%10% |
| Bench, Second quality | 50%10% |
| Bailey's (Stanley R. & L. Co.) | 50%10% |
| Iron Planes | |
| Bailey's (Stanley R. & L. Co.) | 50%10% |
| Miscellaneous Planes (Stanley R. & L. Co.) | 25%10% |
| Steele's Iron Planes | 50%50%5% |
| Meriden Mal. Iron Co.'s | 50%50%5% |
| Davis' Iron Planes | 60%50%5% |
| Birmingham Plane Co. | 60%60%5% |
| Gage Tool Co.'s Self-Setting | 20%10%10% |
| Chapman's Iron Planes | 50%50%5% |
| Sargent's | 60%60%10% |
| Standard Tool Co. | 60%50%5% |
| Plane Irons— | |
| Butcher's | 50%50%5% to A |
| Buck Bros. | 50% |

| | |
|---|---|
| Auburn Thistle | 30%10%30%10%10% |
| Ohio | 30%10%30%10%10% |
| Sandusky | 25% |
| L. & J. White | 50%10% |
| Stanley R. & L. Co. | 50%10% |
| Plates— | |
| Felloe | 50% 0%60% |
| Pilers and Nippers— | |
| Button's Patent | 60% |
| Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 | 40% |
| Humason & Beckley Mfg. Co. | 50%50%10% |
| Lindsay's Giant | 39%4% |
| Gas Pliers | 60% |
| Gas Pliers, Custer's Nickel Plated | 60%5% |
| Eureka Pliers and Nippers | 40% |
| Russell's Parallel Cutters | 25% |
| P. S. & W. Cast Steel | 50% |
| P. S. & W. Timmers' Cutting Nippers | add 6% |
| Carew's Pat. Wire Cutters | 50% |
| Morrill's Parallel | 50% doz. \$12.00 |
| Cronk's 5 in., \$15.00; 10 in., \$20.00 | 50% |
| Cronk's Bull Cutter | 50%10%50% |
| Cronk's Carrier Pliers | 60%60%5% |
| Plumbs and Levels— | |
| Regular list | 75%10%75%10%10% |
| Stanley's Duplex | 20%10% |
| Stanley's Handy | 30%10% |
| Diston's | 50% |
| Cook's | 40%10% |
| Pocket Levels | 70%10%70%10%10% |
| Davis Iron Levels | 30% |
| Davis Inclinoimeters | 10%10% |
| Poachers, Egg— | |
| Buffalo Steam Egg Poachers | 50% doz. |
| No. 1, \$6.00; No. 2, \$9.00 | 38%4% |
| Silver & Co., 6-Ring | 50% doz. \$4.00; 6-Ring \$5.00 |
| Pokes, Animal— | |
| Bishop's I. X. L. | 50% doz \$5.00 |
| Bishop's Monarch | 50% doz \$4.50 |
| Bishop's Pioneer | 50% doz \$4.00 |
| Bishop's American | 50% doz \$4.00 |
| Eagle, Double State | 50% doz \$5.75 |
| Eagle, Single State | 50% doz \$5.75 |
| Buckeye, Single State | 50% doz \$5.75 |
| Bolding | 50% doz \$5.00 |
| Metallic Horse Poke | 50% doz. \$6.00 |
| Police Goods— | |
| R. I. Tool Co. Handcuffs | \$15.00 50% doz 10% |
| R. I. Tool Co. Leg Irons | \$25.00 50% doz 10% |
| Towers | 50% |
| Daley's Improved Handcuffs; 2 Hands, Polished | 50% doz. \$48.00; Nickleplated, \$57.00; 3 hands, Polished, 50% doz. \$72.00; Nickleplated, \$84.00 |
| J. P. Lovell's Police Goods | 50% |
| Polish— | |
| Metal— | |
| Prestoline | 80% |
| Prestoline Paste | 38%4% |
| Gaston's Silver compound | 38%4% |
| Stove— | |
| Joseph Dixon's | 50% gro. \$6.00, 10% |
| Gen | 50% gro. \$4.50, 10% |
| Gold Medal | 50% gro. \$5.50 |
| Lustro | 50% gro. \$4.75 |
| Ruby | 50% gro. \$3.75 |
| Rising Sun, 5 gro lots | 50% gro. \$5.50 |

Pullers, Nail-

Garanton. \$ doz. \$18.00, 38¢
 Giant, No. 1. \$ doz. \$18.00, 10¢
 Giant, No. 2. \$ doz. \$15.00, 10¢
 Pelican. \$ doz. \$9.00, 25¢
 Pelican. \$ doz. \$24.00, 40¢
 Economy. \$ doz. \$6.00

Pulleys-

Hot House, Awning, &c. 60¢@70¢
 Japanned Screw. 60¢@10¢
 Brass Screw. 60¢@10¢
 Japanned Side. 60¢@10¢
 Moore's Side, Anti Friction. 50¢
 Moore's Ceiling or End, Anti-Friction. 40¢
 Moore's Dumb Waiter, Anti-Friction. 50¢
 Moore's Electric Light. 38¢
 Japanned Clothes Line. 60¢@10¢
 Hay Fork, Solid Eye. \$4.50
 Hay Fork, "Anti-Friction," 5 in. solid. \$5.70
 Hay Fork, "Common and Patent" 20¢
 Hay Fork, Tarbox Pat. Iron. 20¢
 Hay Fork, Reed's Self-Lubricating. 30¢
 Hay Fork, Coe's Anti-Friction 5 in. 40¢
 Wheel, \$ doz. \$12.00
 Shade Rack. 45¢
 Tackle Blocks—See Blocks.
 Sheppard's Niagara, No. 25. \$ doz 23¢ net
 Cash (Anger Mortise). 60¢
 Common Sense. 60¢
 Empire. 60¢
 Ideal, Nos. 2, 4, 10 & 15. 90¢ less 1¢
 Acme. doz net.
 Star. 60¢
 On bbl. lots extra 5¢.
 Ideal, Nos. 25 and 55. \$ doz. 22¢ net.

Pumps-

Cluston, Best Makers. 60¢@80¢10¢
 Pitcher Spout, Best Makers. 67¢@70¢
 Pitcher Spout, Cheaper G'ds. 75¢@75¢10¢

Punches-

Saddler's or Drive, good. \$ doz. 60¢@65¢
 Bemis & Call Co.'s Cast Steel Drive. 60¢@65¢
 Bemis & Call Co.'s Springfield Socket. 60¢
 Spring, good quality. \$ doz. \$2.50@3.00
 Spring, Leach's Pat. 15¢
 Bemis & Call Co.'s Spring. 50¢@55¢
 Bemis & Call Co.'s Check. 55¢
 Solid Timmers, P., S. & W. Co. \$1.44
 Timmers' Hollow Punches, P., S. & W. Co. 20¢@25¢
 Rice Hand Punches. 15¢
 Avery's Revolving. 40¢
 Avery's Sawset and Punch—See Sawsets
 Niagara Hollow Punches. 20¢@25¢
 Niagara Solid Punches. 50¢

Rail-

Sliding Door, Wrt Brass. \$ B. 35¢, 40¢
 Sliding Door, Bronzed Wrt Iron. \$ ft. 7¢
 Sliding Door, Iron, Painted. \$ ft. 4¢, 4¢
 Barn Door, Light. \$ 3¢
 Per 100 feet. \$2.00 2.50 3.10, 10¢
 B. D. for N. E. Ham. Small. Med. Large.
 Per 100 feet. \$3.15 2.70 3.25 Net
 Terry's Steel Rail. \$ ft. 4¢
 Victor Track Rail, 7¢ ft. 50¢@25¢
 Carrier, double braced, Steel Rail, 3¢@4¢
 Lundy Parlor Door, Planed Edge. 25¢@10¢
 Moore's Steel Rail. 25¢@10¢
 Moody Steel Rail \$ ft. 6¢ 45¢

Rakes-

Cast Steel, Association G'ds. 70¢@70¢5¢2¢
 Cast Steel, outside G'ds. 70¢@70¢5¢2¢
 Malleable. 70¢@70¢5¢2¢
 Gibbs' Lawn Rake. \$ doz. \$4.00
 Gibbs' Canton Lawn Rake. \$ doz. \$3.75
 Gibbs' Acme Lawn Rake. \$ doz. \$4.75
 Gibbs' Favorite Lawn Rake. \$ doz. \$3.90
 Gibbs' Crown Lawn Rake, No. 1. \$ doz. \$4.90; No. 2, \$3.50
 Onelda Lawn Rake. \$ doz. \$6.00
 Fort Madison Prize Bow. \$ doz. \$6.50
 Fort Madison Steel Tooth Lawn Rake. \$3.00

Razors-

J. R. Terry Razor Co. 20¢
 Wootenholm and Butcher, \$10 to \$10. 10¢
 Jordan's A.A.I., new list. Net
 Jordan's Old Faithful, new list. Net
 Galvanic. \$ doz. \$15.00
 Electric Cutlery Co. Net
 Campbell Cutlery Co. 50¢

Razor Strops-

See Strops, Razor.

Registers -

Moore's Japanned. 75¢
 Moore's Electroplated. 75¢
 Moore's Bronze Finishes. 70¢
 Moore's Solid Bronze. 65¢
 Moore's Stove Pipe. 35¢

Rings and Ringers-

Bull Rings-
 Union Nut Co. 55¢
 Sargent's. 75¢@10¢
 Hotchkiss' low list. 30¢
 Humason, Beckley & Co. 70¢@10¢
 Peck, Stow & W. Co.'s 50¢@10¢@50¢10¢10¢
 Birch Haw. Co., White Metal, low list. 50¢@10¢10¢

Hog-

Top of the Hill Ringers. \$ doz 2.00
 Top of the Hill Rings. \$ doz 1.25
 Hill's Improved Ringers. \$ doz 1.25
 Hill's Old Style Ringers. \$ doz 1.25
 Hill's Tongs. \$ doz 1.00
 Hill's Rings. \$ doz 1.00
 Perfect Rings. \$ doz 1.15
 Perfect Rings. \$ doz 1.25
 Blair's Hog Ringers. \$ doz 2.00
 Blair's Hog Rings. \$ doz 90¢@1.00
 Champion Ringers. \$ doz 2.00
 Champion Rings, Double. \$ doz 2.25
 Brown's Ringers. \$ doz 2.00
 Brown's Rings. \$ doz 1.15
 Electric Hog Rings. \$ doz boxes \$1.25
 Electric Hog Ringers. \$ doz 2.00
 Major Rings. \$ doz 1.25
 Major Ringers. \$ doz 2.00

Rivets and Burrs-

Norway Iron, list Nov. 17, '87. 60¢@10¢
 Second quality. 70¢
 Copper. 60¢@90¢10¢
 Coppered Iron, Bettina Brand. 50¢@5¢

Rivet Sets—See Sets.**Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods-**

Stair, Brass. 25¢@30¢
 Stair, Black Walnut. \$ doz 40¢

Rollers-

Burn Door, Sargent's list. 60¢@10¢10¢
 Aime Moore's Anti-Friction. 55¢
 Union Barn Door Roller. 70¢
 Moore's Barn Door Stay. 50¢
 Thompson Mfg. Co.'s Lawn Rollers. 30¢

Rope—The following prices are for b. New York or factory, and are shaded 1/4¢@3/4¢ on large lots; terms, 1 1/4% for cash.
 Manila, 7-16 in. diam. and larger. 8¢
 Manila, 3/4 and 5-16 in. 9¢
 Manila, Tarred Rope. 8¢
 Manila, Hay Rope, Medium. 8¢
 Sisal. 7-16 inch and larger. 7¢
 Sisal. 3/4 and 5-16 in. 7¢
 Sisal, Hay Rope. 8¢
 Sisal, Tarred Rope. 8¢
 Sisal, Medium Lath Yarn. 6¢
 New Zealand. 7-16 in. & larger. 6¢
 New Zealand. 3/4 inch. 7¢
 New Zealand. 1/4 and 5-16 inch. 7¢
 New Zealand, Hay Rope. 8¢
 New Zealand, Tarred Rope. 8¢
 Co. Rope. \$ B 13¢@14¢
 Jute Rope. \$ B 6¢@7¢

Wire-

List February, 1892. All kinds. 45¢

Rules-

Boxwood. 80¢@10¢@80¢10¢10¢10¢
 Ivory. 50¢@10¢
 Starrett's Steel Rules and Straight Edges. 25¢@10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.

Note.—Extra 5¢@10¢ often given.

Saws-

Disston's Circular. 45¢@45¢5¢
 Disston's Cross Cut, list Jan. 1, '93. 40¢@10¢
 Disston's Hand. 25¢
 Woodruff & McFarlin. 25¢@10¢
 Hand, Panel and Rip. 45¢@10¢
 Cross Cuts, list Jan. 1, 1893. 45¢@10¢
 Wheeler, Madden & Clemson Mfg. Co. 40¢@10¢
 Hand, Panel and Rip. 45¢@10¢
 Cross Cuts, list Jan. 1, 1893. 40¢@10¢
 Atkins' Circular. 50¢@10¢
 Atkins' Cross Cut new list. 40¢
 Atkins' Muley, Mill and Drag. 50¢@10¢
 Atkins' One-Man Saw. 40¢
 Atkins' Wood Saws. 40¢
 Peace Circular and Mill. 45¢@45¢5¢
 Peace Hand Panel and Rip. 25¢@25¢5¢
 Peace Cross Cut, list Jan. 1, '93. 45¢@10¢
 Richardson's Circular and Mill. 45¢@45¢5¢
 Richardson's X Cuts, list Jan. 1, '93. 45¢@10¢
 Richardson's Hand, &c. 25¢@25¢5¢
 C. E. Jennings & Co.'s. 25¢

Hack Saws-

Griffin's, complete. 40¢@10¢50¢
 Griffin's Hack Saw Blades. 40¢@10¢50¢
 Star Hack Saws and Blades. 25¢
 Eureka and Crescent. 25¢

Scroll-

Lester, complete, \$10.00. 25¢
 Rogers, complete, \$4.00. 25¢
 Barnes' Builders' and Cab Makers' \$15.25. 35¢
 Barnes' Scroll Saw Blades. 35¢

Saw Frames-

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales-**

Hatch, Counter, No. 171, good quality. \$ doz \$18.00@19.00
 Hatch, Tea, No. 161. \$ doz \$8.50@9.00
 Union Platform, Plain. \$2.10@2.20
 Union Platform, Striped. \$2.40@2.50
 Chatillon's Grocers' Trip Scales. 50¢
 Chatillon's Eureka. 25¢
 Chatillon's Favorite. 40¢
 Family Turnbills. 30¢@30¢10¢
 Riehle Bros' Platform. 40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting. 45¢**Scrapers-**

Adjustable Box Scraper (S. R. & L. Co.) \$8.00 30¢@10¢
 Box 1 Handle. \$ doz \$2.25@2.50
 Box 2 Hnds. \$ doz \$3.00@3.25
 Danforth Box and Ship. 30¢@10¢
 Foot. 50¢@10¢80¢
 Ship, Common. \$ doz \$3.50 net
 Ship, R. I. Tool Co. 10¢

Screen Window and Door

Frames—See Frames

Screw Drivers-

See Drivers, Screw.

Screws-**Bench and Hand-**

Bench, Iron. 55¢@10¢55¢10¢10¢
 Bench, Wood, Beech. \$ doz \$2.25
 Bench, Wood, Hickory. 20¢@10¢
 Hand, Wood. 25¢@10¢25¢10¢5¢
 Hand, Grand Rapids, list. 35¢

Coach, Lag and Hand-Rail-

Lag, Blunt Point, list Jan. 1, 1890. 80¢@80¢10¢
 Coach and Lag, Gimlet Point, list Jan. 1, 1890. 80¢@80¢5¢
 Hand Rail, Sargent's. 70¢@10¢
 Hand Rail, H. & B. Mfg. Co. 70¢@10¢75¢
 Hand Rail, Am. Screw Co. 75¢

Jack Screws-

Jack Screws, Millers Falls list. 50¢@50¢10¢
 Jack Screws, P. S. & W. 35¢
 Jack Screws, Sargent. 70¢
 Jack Screws, Stearns'. 40¢@40¢10¢

Cork-

Humason & Beckley Mfg. Co. 40¢@10¢50¢
 Williamson's. 35¢@35¢45¢
 Williamson's Forged Worm, Applewood Handle, \$ doz. \$5.00; Rosewood, \$5.50. 40¢
 Detroit Cork Screw Co. 33¢

Machine-

Flat Head Iron. 65¢
 Round Head Iron. 60¢

Wood-

List January 1, 1891. 70¢
 Flat Head Iron. 65¢ Extra 10¢
 Round Head Brass. 70¢ 10¢often
 Round Head Bronze. 65¢ given.
 Flat Head Bronze. 70¢
 Round Head, Bronze. 65¢
 Rogers' Drive Screws. 82¢

Scroll Saws—See Saws, Scroll.**Scythes-**

Grain. 40¢@5¢40¢10¢
 Grass. 40¢@10¢50¢

Scythe Snaths—

See Snaths, Scythe.

Sets-

Awl and Tool-
 Aiken's Sets, Awls and Tools. 60¢@60¢5¢
 Fray's Adj. Tool Hdl., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9. 45¢
 Millers Falls Adj. Tool Hdl., Nos. 1, \$12; 2, \$18. 25¢
 Henry's Combination Haft. \$ doz \$6.50
 Stanley's Excelsior. No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50. 30¢@10¢
 Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50. 70¢@10¢5¢

Nail-

Square. \$ gr. \$4.00@4.25
 Round. \$ gr. \$3.25
 Buck Bros. 27¢
 Cannon's Diamond Point. \$ gr. \$12. 20¢

Rivet-

Regular list. 70¢

Saw-

Stillman's Genuine. \$ doz \$5.00@7.75, 40¢@5¢
 Stillman's Pattern, Hand, \$ doz \$3.25, 40¢@5¢
 Crook Cut, \$5.50. 55¢@55¢10¢
 Common Lever. \$ doz \$2.00, 40¢@50¢
 Morrill's No. 1, \$15.00. 40¢@20¢
 No. 11, \$16.00. 40¢@20¢
 Nos. 3 and 4, Cross Cut, \$23.00. 40¢@20¢
 No. 6, Mill, \$11.00. 40¢@20¢
 No. 10, \$5.50. 40¢@20¢
 Leach's No. 3, \$8.00. No. 1, \$15. 15¢@20¢
 Nash's. 20¢@10¢20¢10¢10¢
 Hammer, Hotchkiss. \$5.50, 10¢
 Hammer, Bemis & Call Co.'s new Pat. 45¢
 Bemis & Call spring Hammer. 30¢@5¢
 Bemis & Call Co.'s Plate. 20¢
 Bemis & Call Co.'s Cross Cut. 30¢@5¢
 Aiken's Genuine. \$13.00, 60¢@60¢10¢
 Aiken's Imitation. \$ doz \$3.00@3.25
 Hart's Pat. Lever. 20¢
 Disston's Star. 25¢
 Leopold. 40¢@10¢50¢
 Atkins' Letter. \$ doz No. 1, \$6.00
 Atkins' Cutter. \$ doz No. 1, \$6.00
 Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00. 40¢@10¢50¢
 Avery's Saw Set and Punch. 50¢
 Kohler's Royal. \$ doz \$7.00
 Kohler's Giant Royal. \$ doz \$12.00
 Crescent. \$ doz \$3.00
 Lloyd's. \$ doz \$15. 40¢@10¢
 Taintor Positive. \$ doz \$18. 50¢

Sharpeners, Knife-

Larkin's. \$ doz \$6.00, 40¢
 Applewood Handles. \$ doz \$6.00, 40¢
 Rosewood or Coccoloba. \$ doz \$9.00 40¢

Shaves, Spoke-

Wood. 45¢
 Iron. 30¢
 Bailey's (Stanley R. & L. Co.). 40¢@10¢
 Stearns'. 30¢@10¢
 Cincinnati. 25¢@10¢
 Goodell's \$ doz. \$9.00. 25¢

Shears-

American (Cast) Iron. 75¢@10¢75¢10¢5¢
 Barnard's Lamp Trimmers. \$ doz \$3.75
 Seymour's, list Dec. 1881. 60¢@10¢@60¢10¢10¢5¢
 Heinisch's, list Dec. 1881. 60¢@10¢@60¢10¢10¢5¢

Heinisch's Tailor's Shears. 33¢
 Cast Steel Trimmers: 80¢@80¢10¢
 First quality. 80¢@10¢80¢10¢10¢
 Second quality. 10¢@10¢
 Diamond Cast Shears. 10¢
 Clipper. 10¢@10¢
 Victor Cast Shears. 75¢@10¢75¢10¢5¢
 Howe Bros. & Hulbert, Solid Forged Steel. 40¢
 Hatch Cutlery Co., Solid Steel Forged. 60¢
 Davenport Cutlery Co. 60¢@60¢10¢
 Clauss brand, Japanned. 70¢
 Clauss brand, Nickel, same list. 60¢
 Galvanic 9 to 9 in. \$ doz. \$1.00 10¢
 Electric Cutlery Co. Net
 Campbell Cutlery Co., Jap'd. 75¢
 Nickel Plated. 60¢

Timmers' Snips-

Wrt. Handles, Steel Blades. 20¢@20¢10¢
 Niagara Snips and Shears. 20¢@10¢
 Cast Handles, Laid with Steel. 40¢

Pruning Shears and Hook

Diston's Combined Pruning. \$ doz \$18.00, 20¢@10¢
 and Saw. \$ doz \$18.00, 20¢@10¢
 Diston's Pruning Hook. \$ doz \$12.00, 20¢@10¢
 E. S. Lee & Co.'s Pruning Tools. 50¢@10¢70¢
 Pruning Shears, Henry's Pat. \$ doz \$3.75@4.00
 Henry's Pruning Shears. \$ doz \$4.25
 Wheeler, M. & C. Co., Combination. \$ doz \$12.00

Dunlap's Saw and Chisel. \$ doz \$5.50, 30¢
 J. Mallinson & Co., No. 1, \$6.25; No. 2, \$7.50. 60¢
 P. S. & W. Co. 70¢
 Levin Pruner No. 1, \$15.00 \$ doz. 40¢@25¢
 Levin Pruner No. 2, \$21.00 \$ doz. 40¢@25¢

Timbers, &c.-

Shears and Snips (P. S. & W.). 20¢@25¢
 Snips, J. Mallinson & Co. 35¢@10¢

Sheaves-

Sliding Door-
 M. W. Co., list July 1888. 50¢@10¢50¢5¢
 R. & E., list Dec. 18, 1885. 55¢@50¢
 Corbin's list. 60¢@10¢5¢
 Patent Roller. 60¢@10¢5¢
 Patent Roller, Hatfield's. 75¢
 Russell's Anti-Friction, list Dec. 18, 1885. 60¢@5¢
 Moore's Anti-Friction. 50¢

Sliding Shutter-

R. & E., list Dec. 18, 1885. 60¢@10¢5¢
 Sargent's list. 70¢
 Reading list. 60¢@10¢10¢

Shells-

First quality 4, 8, 10 and 12 gauge. 25¢@10¢5¢
 brands, 14, 16 and 20 gauge (\$7.50 list). 20¢@10¢5¢
 Prize. 40¢@5¢
 Star, Club, Rival and Climax Brands. 33¢@10¢5¢
 Smokeless brand, 12, 10, 16 gauge. 33¢@10¢5¢
 Trap brand, 12 and 10 gauge. 33¢@10¢5¢
 Seibold's Comb. Shot Shells. 15¢@5¢
 Brass Shot Shells, 1st quality. 60¢@5¢
 Brass Shot Shells, Club, Rival, Climax. 65¢@5¢

Shells. Loaded-

Standard List, July 19, 1890. 40¢@10¢10¢40¢10¢5¢
 7¢ cash, 10 day a.

Snaps, Harness, &c.

| | |
|------------------------------------|-----|
| Anchor (T. & S. Mfg. Co.) | 50¢ |
| Fitch's (Bristol) | 50¢ |
| Hotchkiss | 10¢ |
| Andrews | 50¢ |
| Sargent's Patent Guarded | 70¢ |
| German, new list | 40¢ |
| Covert, new list | 50¢ |
| Covert, New Patent | 50¢ |
| Covert, New R. E. | 60¢ |
| Covered Spring | 60¢ |
| Covert's Saddlery Works' Triumph | 33¢ |
| John Prots Snaps | 75¢ |
| Kelley & Woolworth's Steel Harness | 50¢ |

Snaths

| | |
|-------|-----|
| Mythe | 50¢ |
|-------|-----|

Soldering Irons

See Irons, Soldering.

Spittoons, Cuspidors, &c.

| | |
|---|--|
| Standard Fiberware | |
| Cuspidors, 8 1/2-inch, # doz., No. 5, \$8; No. 5, \$9 | |
| Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, \$6 | |

Spoke Shaves

See Shaves, Spoke.

Spoke Trimmers

See Trimmers, Spoke.

Spoons and Forks**Tinned Iron**

| | |
|---|-----|
| Basting, Cen. Stamp. Co.'s list | 70¢ |
| Solid Table and Tea, Cen. Stamp. Co.'s list | 70¢ |
| Buffalo, S. S. & Co. | 33¢ |

Silver Plated

| | |
|------------------------------|-----|
| 4 months or 5¢ cash 30 days: | |
| Meriden Brit. Co., Rogers | 40¢ |
| C. Rogers & Bros. | 40¢ |
| Rogers & Bros. | 40¢ |
| Reed & Barton | 40¢ |
| Wm. Rogers Mfg. Co. | 40¢ |
| Simpson, Hall, Miller & Co. | 40¢ |
| Holmes & Edwards Silver Co. | 40¢ |
| L. Boardman & Son | 50¢ |

Miscellaneous

| | |
|---|-----|
| Holmes & Edwards Silver Co. | |
| No. 87 Mexican Silver | 50¢ |
| No. 80 Silver Metal | 50¢ |
| No. 24 German Silver | 50¢ |
| No. 60 Nickel Silver | 50¢ |
| No. 49 Nickel Silver | 50¢ |
| Wm. Rogers Mfg. Co. | |
| Rogers' Silver Metal | 50¢ |
| 18¢ Rogers' German Silver | 50¢ |
| 22¢ Rogers' Nickel Silver | 50¢ |
| German Silver | 50¢ |
| German Silver, Hall & Elton | 50¢ |
| Nickel Silver | 50¢ |
| Britannia | 50¢ |
| Boardman's Nickel Silver, list July 1, 1891 | 50¢ |
| Boardman's Britannia Spoons, cash lots | 50¢ |

Spring

| | |
|---|-----|
| Torrey's Rod, 38 in. | 50¢ |
| Warner's No. 1, # doz \$1.50; No. 2, \$4.40 | |
| Gem (Coil), list April 10, 1888 | 20¢ |
| Star (Coil), list April 10, 1888 | 20¢ |
| Victor (Coil) | 60¢ |
| Champion (Coil) | 60¢ |
| Dowell's, No. 1, # doz \$1.80; No. 2, \$15.00 | |
| Rubber, complete, # doz \$4.50 | |
| Phenolics | 50¢ |
| Phoenix | 33¢ |

Carriage, Wagon, &c.

| | |
|--|-----|
| Elliptic, Concord, Platform and Half Scoll | |
| 60¢ to 100¢ to 100¢ to 100¢ or net prices | |
| Cliff's Bolster Springs | 25¢ |

Squares

| | |
|--|-----|
| Steel and Iron | 80¢ |
| Nickel Plated | 80¢ |
| Try Square and T Bevels | 60¢ |
| Diston's Try Square and T Bevels | 50¢ |
| Winterbottom's Try and Miter | 30¢ |
| Starrett's Micrometer Calliper Squares | 25¢ |
| Avery's Flush Bevel Squares | 40¢ |
| Avery's Bevel Protractor | 50¢ |

Squeezers

| | |
|------------------|-----|
| Fodder | |
| Blair's | 50¢ |
| Blair's "Olimax" | 50¢ |

Lemon

| | |
|---|-----|
| orecelain Lined, No. 1 | 25¢ |
| Wood, No. 2 | 30¢ |
| Wood, Common | 30¢ |
| Dunlap's Improved | 30¢ |
| Sammis | 30¢ |
| 118 # doz | 25¢ |
| Jennings' Star | 25¢ |
| The Boss | 25¢ |
| Dean's, Nos. 1, # doz \$8.50; 2, \$3.35; 3, \$1.90; Queen, \$2.50 | |
| Little Giant | 50¢ |
| King | 40¢ |
| Hotchkiss Straight Flash | 40¢ |
| Silver & Co., Glass | 50¢ |

Standard Fiber Ware

See Ware, Standard Fiber.

Staples

| | |
|----------------------------------|------------|
| Barbed Blind, 1/2 in. and larger | 7¢ |
| Barbed Blind, 1/2 in. | 8¢ |
| Fence Staples, Galvanized | Same price |
| Fence Staples Plain | Same price |
| Grand Crossing Tack Co.'s list | 75¢ |

Steelyards

| | |
|-------------|--|
| 40¢ to 100¢ | |
|-------------|--|

Stocks and Dies

| | |
|--------------------------|-----|
| Blacksmith's | |
| Waterford's Goods | 35¢ |
| Lighting Screw Plate | 25¢ |
| Reece's New Screw Plates | 25¢ |
| Reversible Ratchet | 30¢ |
| Green River | 35¢ |

Stops, Bench

| | |
|---|-----|
| McGill's, # doz \$3 | 10¢ |
| Cincinnati | 25¢ |
| Torrell's Nos. 1 and 2, # doz, \$3; No. 3, \$5.60 | |
| Millers Falls | 25¢ |
| Stearns | 30¢ |

Stones, Grind—See Grindstones.

| | |
|---------------------------------------|--------|
| Pike Mfg. Co., list April, 1892 | 33¢ |
| Cleveland Stone Co., list Nov. 1892 | 33¢ |
| Oil Stones, &c. | |
| Pike Mfg. Co. | |
| Hindustan No. 1, # doz | 8¢ |
| Sand Stone | 5¢ |
| Turkey Oil Stone, 4 to 8 in. | 40¢ |
| Lily White Washita | 60¢ |
| Rosy Red Washita | 60¢ |
| Washita Stone, Extra | 60¢ |
| Washita Stone, No. 1 | 40¢ |
| Washita Stone, No. 2 | 30¢ |
| Lily White Slips | 60¢ |
| Rosy Red Slips | 60¢ |
| Washita Slips, Extra | 80¢ |
| Washita Slips, No. 1 | 70¢ |
| Arkansas Stone, No. 1, 3 to 5 1/2 in. | \$2.80 |
| Arkansas Stone, No. 1 1/2 to 8 in. | \$3.50 |
| Lake Superior | 13¢ |
| Lake Superior Slips | 20¢ |

Stove Polish

See Polish, Stove.

Stretchers Carpet

| | |
|---|-----|
| Cast Steel, Polished | 2¢ |
| Cast Iron, Steel Points | 75¢ |
| Socket | 17¢ |
| Bullard's | 25¢ |
| Genuine Emerson | 60¢ |
| Station | 20¢ |
| Torrey's | 20¢ |
| Badger's Belt and Com. | 20¢ |
| Lamont Combination | 40¢ |
| Jordan's Pat. Padded, list Nov. 1, 189, 50¢ | |
| Electric Cutlery Co. | Net |
| Campbell Cutlery Co. | Net |

Stuffer, Sausage

| | |
|--|-----|
| Miles' Challenge, # doz \$20 | 50¢ |
| Perry, # doz, No. 1, \$15.00; No. 2, \$21.00 | |
| Enterprise Mfg. Co., list Jan 17, '93, 25¢ | |
| Enterprise Mfg. Co., list Jan 17, '93, 25¢ | |
| Silver's | 40¢ |

Sweepers, Carpet and Lawn

| | |
|--|-----|
| Bissell No. 5 | 17¢ |
| Bissell No. 8 | 20¢ |
| Bissell, Grand | 30¢ |
| Standard | 30¢ |
| Domestic | 30¢ |
| Domestic, No. 2 | 30¢ |
| Grand Rapids | 30¢ |
| Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00 | |
| Imperial | 15¢ |
| Nickel | 27¢ |
| Jannet | 24¢ |
| Excelsior | 22¢ |
| Garland | 18¢ |
| Parlor Queen | 24¢ |
| Housewife's Delight | 15¢ |
| Friend | 15¢ |
| Ladies' Friend No. 2 | 15¢ |
| Advance | 18¢ |
| Our Leader | 19¢ |
| Triumph | 20¢ |
| Supreme | 22¢ |
| Jap'd, # doz \$22.00; Nickel, \$24.00 | |
| Gilt Edge | 32¢ |
| Acme | 32¢ |
| Imperial | 32¢ |
| Grand Republic | 32¢ |
| Jap'd, # doz \$30.00; Nickel, \$33.00 | |
| Banner | 32¢ |
| The Star | 32¢ |
| Reliable | 32¢ |
| Rapid Jap'd, # doz, \$22.00; Nickel, \$24.00 | |
| Our Own | 32¢ |
| Model | 32¢ |
| Goshen Sweeper Company, Grand Rapids, Mich., make the following rates: | |
| 5 dozen in 6 months | 10¢ |
| 10 dozen in 6 months | 20¢ |
| Exception on L.F., when 10 dozen price is \$13.50, and 25 dozen \$13.00. | |

Lawn

| | |
|-------------------|-----|
| Thompson Mfg. Co. | 30¢ |
|-------------------|-----|

Swings

| | |
|-------------|-----|
| Davies Lawn | 25¢ |
|-------------|-----|

Tacks, Brads &c.

| | |
|---|-----|
| List October 19, 1893. Old established straight Weights. Short Weight goods are sold at lower prices. | |
| Carpet Tacks | 60¢ |
| American, Blued | 70¢ |
| American, Tin'd and Cop'd | 70¢ |
| Steel, Bright and Blued | 70¢ |
| Steel, Tinned and Coppered | 70¢ |
| Swedes Iron, Blued | 70¢ |
| Swedes Iron, Tinned | 70¢ |
| American Iron Tacks, Domestic | 60¢ |
| Swedes Iron Tacks | |
| S. S., Blued | 60¢ |
| S. S., Tinned | 70¢ |
| Lanc., Blued | 55¢ |
| Lanc., Tinned | 60¢ |
| Grip and Lace Tacks | 60¢ |
| S. S., Blued | 62¢ |
| S. S., Tinned | 60¢ |
| Lanc., Blued | 55¢ |
| Lanc., Tinned | 60¢ |
| Basket and Trimmers Tacks | |
| Lanc. | 52¢ |
| S. S. | 55¢ |
| Hungarian Nails | 80¢ |
| Common and Patent Brads | 55¢ |
| Leathered Tacks | 10¢ |
| Brush Tacks, S. S. | 60¢ |
| Looking Glass Tacks, S. S. | 35¢ |
| Picture Frame Points, S. S. | 35¢ |
| Finishing Nails | 45¢ |
| Trunk and Clout Nails | 60¢ |
| Black | 65¢ |
| Tinned or Coppered | 67¢ |
| Basket Nails | 60¢ |
| Chair Nails | 52¢ |
| Figur Box Nails | 45¢ |
| Tin Capped Nails | 50¢ |
| Miscellaneous | |
| Double Point | 90¢ |
| Wire Carpet Nails | 50¢ |
| Claw Handle Carpet | 40¢ |
| Bonnie Blue | 10¢ |

Wire Brads and Nails

| | |
|---|-----|
| Steel-Wire Brads, R. & E. Mfg. Co.'s list | 50¢ |
| See also Nails, Wire | |

Tanks, Oil

| | |
|--|-----|
| Emerald, S. S. & Co.: 30-gal. \$3.75; 60-gal., \$11 each | |
| Chesterman's, Regular list | 25¢ |

Tapes, Measuring

| | |
|----------------------------|-----|
| American | 40¢ |
| Chesterman's, Regular list | 25¢ |

Thermometers

| | |
|----------|-----|
| Tin Case | 80¢ |
|----------|-----|

Thimble Skeins—See Skeins**Ties, Bale—Steel**

| | |
|---------------------|-----|
| Standard Wire, list | 50¢ |
|---------------------|-----|

Tinners' Shears, &c.

See Shears, Tinners' &c.

Tinware

| | |
|---|-----|
| Stamped, Japanned and Placed, list Jan 20, 1897 | 70¢ |
|---|-----|

Tire Benders, Upsetters, &c.—See Benders and Upsetters**Tire****Tobacco Cutters**

See Cutters, Tobacco.

Tools

| | |
|----------------------------|-----|
| Bradley's | 20¢ |
| Barton's | 20¢ |
| L. & J. White | 20¢ |
| Alberson Mfg. Co. | 25¢ |
| Sandusky Tool Co. | 30¢ |
| Shaves Cincinnati Tool Co. | 20¢ |

Lumber

| | |
|--|-----|
| Ring Peavies, Blue Line | 20¢ |
| Ring Peavies, Common | 18¢ |
| Steel Socket Peavies | 24¢ |
| Mail Iron Socket Peavies | 19¢ |
| Cant Hooks, "Blue Line" | 16¢ |
| Cant Hooks, Common Finish | 14¢ |
| Cant Hooks, Mail Socket Clasp, "Blue Line" | 16¢ |
| Cant Hooks, Mail Socket Clasp, Common | 14¢ |
| Cant Hooks, Clip Clasp, "Blue Line" | 14¢ |
| Cant Hooks, Clip Clasp, Common Finish | 14¢ |
| Hand Spikes | 6¢ |
| Pike Poles, Pike & Hook | 12¢ |
| 11 ft., 14 ft., 12 ft., 16 ft., 14 ft., 18 ft., 17 ft., 20 ft., 21 ft., 22 ft. | |
| Pike Poles, Pike only | 12¢ |
| 10 ft., 14 ft., 11 ft., 16 ft., 13 ft., 18 ft., 16 ft., 20 ft., 20 ft. | |
| Pike Poles, not ironed | 12¢ |
| 12 ft., 14 ft., 16 ft., 18 ft., 16 ft., 18 ft., 12 ft., 14 ft., 16 ft. | |
| Setting Poles | 12¢ |
| 14 ft., 15 ft., 18 ft., 17 ft. | |
| Swamp Hooks | 18¢ |

Saw

| | |
|------------------|-----|
| Atkins, new list | 40¢ |
|------------------|-----|

Transom Lifters

See Lifters, Transom.

Traps—Game

| | |
|----------------------|-----|
| Newhouse | 40¢ |
| Onida Pattern | 75¢ |
| Game, Blake's Patent | 50¢ |

Mouse and Rat

| | |
|--|-----|
| Mouse Wood, Choker, # doz holes, 9 to 10 | |
| Mouse, Round Wire | 15¢ |
| Mouse, Cage, Wire | 10¢ |
| Mouse, Catch-em-alive | 15¢ |
| Mouse, Bonanza | 10¢ |
| Mouse, Decoy | 10¢ |
| Ideal | 10¢ |
| Cyclone | 10¢ |
| Hotchkiss Metallic Mouse, 5-hole traps | 10¢ |
| # doz, 75¢; in full cases, # doz. 60¢ | |
| Hotchkiss Imp. Rat Killer | 18¢ |
| Hotchkiss New Pat. Rat Killer | 18¢ |
| Schuyler's Rat Killer | 15¢ |
| Dandy | 15¢ |
| Wadell's Go Bang, # gro. | 12¢ |

Fly

| | |
|-------------------------------|-----|
| Harper, Champion or Paragon | 15¢ |
| Balloon, Globe or Acme | 15¢ |
| # doz. \$1.50, # gro. \$13.50 | |

Triers

| | |
|-------------------|-----|
| Butter and Cheese | 25¢ |
|-------------------|-----|

Trimmers, Spoke

| | |
|---------------------------------------|-----|
| Bonney's | 10¢ |
| Stearns | 10¢ |
| Ives', No. 1, \$15.00; No. 2, \$12.00 | |
| Douglas | 10¢ |
| Cincinnati | 25¢ |

Trowels

| | |
|---|-----|
| Lothrop's Brick and Plastering | 20¢ |
| Red's Brick and Plastering | 15¢ |
| Diaston's Brick and Plastering | 25¢ |
| Peace's Plastering | 25¢ |
| Clement & Maynard's | 20¢ |
| Rose's Brick | 15¢ |
| Brade's Brick | 25¢ |
| Worral's Brick and Plastering | 20¢ |
| Garden Angle Trowel, # gro. No. 1, \$8.00; No. 2, \$3.00; No. 3, \$1.50 | |

Trucks, Warehouse, &c.

| | |
|--------------------------------------|-----|
| B. & L. Block Co.'s list | 40¢ |
| Thompson Mfg. Co. | 40¢ |
| Garrett's Barrel | 40¢ |
| Daisy Stove Trucks, Improved pattern | 40¢ |
| # doz. \$18.00 | |

Tubes, Boiler

See Pipe.

Twine

| | |
|--|-----|
| No. 9, 10 and 11 Balls | 20¢ |
| No. 12, 13 and 14 Balls | 20¢ |
| No. 15, 16 and 17 Balls | 20¢ |
| No. 18, 19 and 20 Balls | 20¢ |
| No. 21, 22 and 23 Balls | 20¢ |
| No. 24, 25 and 26 Balls | 20¢ |
| No. 27, 28 and 29 Balls | 20¢ |
| No. 30, 31 and 32 Balls | 20¢ |
| No. 33, 34 and 35 Balls | 20¢ |
| Chalk Line, Cotton, 1/2 in. Balls | 20¢ |
| Mason Line, Linen, 1/2 in. Balls | 20¢ |
| 2-Ply Hemp, 1/2 in. and 3/4 in. Balls (Spring Twine) | 15¢ |
| 3-Ply Hemp, 1/2 in. Balls | 15¢ |
| 3-Ply Hemp, 3/4 in. Balls | 15¢ |
| Cotton Wrapping, 5 Balls to a lb. | 15¢ |
| 2, 3, 4 and 5 Ply Jute, 1/2 in. Balls | 10¢ |
| Wool | 10¢ |
| Paper | 10¢ |
| Cotton Mops, 6, 9, 12 and 15 # to do. | 15¢ |

Vises

| | |
|-----------|-----|
| Solid Box | 50¢ |
|-----------|-----|

Parallel

| | |
|------------------------------|-----|
| Fisher & Norris Double Screw | 15¢ |
| Stephens | 25¢ |
| Parker's | 25¢ |
| Wilson's | 25¢ |
| Howard's | 25¢ |
| Bonney's | 25¢ |
| Miller's Falls | 40¢ |
| Trouton | 40¢ |
| Merrill's | 15¢ |
| Hollands | 25¢ |
| Sargent's | 70¢ |
| Backus and Union | 40¢ |
| Double Screw Leg | 15¢ |
| Phillips | 20¢ |
| Simpson's Adjustable | 40¢ |
| Moore's | 40¢ |
| Massey Quick Action | 30¢ |

Whips

| American Whip Co., Length. | 4 1/2 | 5 | 5 1/2 | 6 | 6 1/2 | 7 | 7 1/2 | 8 ft. |
|---|---------|-------|-------|-------|-------|-------|-------|------------------|
| X. L. Whalebone Driving..... | \$18.00 | 20.00 | 22.00 | 24.00 | 27.00 | 30.00 | 33.00 | 36.00 |
| Mureka, Two-thirds Whalebone..... | 15.00 | 16.50 | 18.00 | 20.00 | | | | |
| Bull Bone, Half-length Whalebone..... | | | 11.00 | 12.00 | 13.00 | 15.00 | | |
| American Standard..... | 8.00 | 8.50 | 9.50 | 10.50 | 12.00 | 13.50 | 15.00 | 16.50 |
| True Grip, Raw Hide Center..... | 6.00 | 6.00 | 6.50 | 7.00 | 7.50 | 9.00 | | |
| New Name, Stocked Java, Black and Wine Colors..... | | | 6.00 | | | | | |
| American, 98 Pen Whip..... | | | 6.00 | | | | | |
| Gents' Light Driving No. 111..... | | | 6.00 | | | | | |
| Gents' Light Driving No. 106..... | | | 5.00 | | | | | |
| Hand-made Stocked Java No. 108..... | | | 8.75 | 4.00 | | | | |
| A large variety of cheaper grades..... | | | | | | | | \$2.00 to \$3.00 |
| Team Whips..... | | | | | | | | \$2.00 to \$3.00 |
| Toy Whips..... | | | | | | | | \$2.00 to \$3.00 |
| Hardware Assortment, 10/American, 75 Whips for \$50.00. | | | | | | | | \$2.50 to \$3.00 |

Wire and Wire Goods—

Iron—

| Market, | Br. & Ann., Nos. 0 to 18. | Extra 50 to 100 often given and net prices often made on large lots. |
|----------------------------------|---------------------------|--|
| Br. & Ann., Nos. 0 to 18. | 75¢ to 10¢ | |
| Opp'd, Nos. 0 to 18. | 75¢ to 10¢ | |
| Galv., Nos. 0 to 18. | 75¢ to 10¢ | |
| Tin'd, Tin'd list, Nos. 0 to 18. | 70¢ to 10¢ | |

| Stone, Br. and Ann'd, | Nos. 16 to 18. | 80¢ | Extra 10% |
|--|----------------|-----|-----------|
| Nos. 16 to 18. | 80¢ | | |
| Nos. 27 to 38. | 82¢ | | |
| Tinned Broom Wire, 18 to 21. | 75¢ | | |
| Galvanized Fence | 75¢ | | |
| Brass, list Jan. 18, 1894. | 40¢ | | |
| Copper, list Jan. 18, 1894. | 40¢ | | |
| Ann'd Wire on Spools. | 60¢ | | |
| Malin's Ann'd & Tin'd on Spools. | 60¢ | | |
| Malin's Brass and Cop. on Spools. | 60¢ | | |
| Ossawan Mills, Ann'd and Tinned on Spools. | 60¢ | | |

| Ossawan Mills, Brass and Copper on Spools. | 50 to 100 |
|--|-----------------|
| Tate's Spooled, Tin'd & Annealed. | 60 to 65 |
| Tate's Spooled Cop. and Brass. | 50 |
| Cast Steel Wire. | 50 |
| Stub's Steel Wire. | \$6.00 to 2, 30 |
| Steel Music Wire, 12 to 30, imported. | 60 to 70¢ |
| Wire Clothes Line, see Lines. | |
| Wire Picture Cord, see Cord. | |
| Bright Wire Goods— | |
| Standard list. | 85 to 100 |
| Wire Cloth and Netting— | |
| Painted Screen Cloth \$100 ft. | \$1.75 |
| Galvanized Wire Netting. | 75 to 75¢ |
| Wire Barb— | |
| See Trade Report. | |
| Wire Rope—See Rope. Wire. | |
| Wrenches— | |

| Bemis & Call's: | |
|---------------------------------|---------------------|
| Pat. Combination Bright..... | 40 to 55 |
| Pat. Combination Black..... | 40 to 55 |
| Merrick's Pattern..... | 30 to 40 |
| Brigg's Pattern..... | 30 to 40 |
| Cylinder or Gas Pipe..... | 45 to 55 |
| No. 3 Pipe..... | 55 |
| Allen's Pocket (Bright)..... | 50 to 100 |
| The Favorite Pocket..... | \$4.00, \$4.00, 40¢ |
| Webster's Pat. Combination..... | 25 |
| Hardman's..... | 35 to 45 |
| Always Ready..... | 55 to 65 |
| Alligator..... | 50 |
| Donohue's Engineer..... | 30 to 40 |
| Eagle..... | 50 to 100 |
| Acme, Bright..... | 50 to 65 |
| Acme, Nickle..... | 40 to 55 |
| Walker's..... | 70 to 85 |
| Diamond Steel..... | 55 to 65 |
| Cincinnati Brace Wrenches..... | 25 to 30 |
| Taft's Vise Wrench..... | 55 to 100 |

Wringers, Clothes—

| Am. Wringer Co.'s list, July 1, '93. | 2¢ cash |
|---|---------|
| Colby Wringer Co., list Sept. 1, '91. | 2¢ cash |
| Lovell Mfg. Co., list July 1, 1892. | 2¢ cash |
| Peerless Mfg. Co., list Feb. 1, 1892. | 2¢ cash |
| National Wringer & Mfg. Co., list June 1, 1892. | 2¢ cash |

Wrought Goods—

| Staples, Hooks, &c., list March 17, 1893. | 85 to 100 |
|---|-----------|
|---|-----------|

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

| Linseed, City, raw, per gal. | 41 |
|---|----|
| Linseed, City, boiled..... | 43 |
| Linseed, Western, raw..... | 40 |
| Lard, City, Extra Winter..... | 68 |
| Lard, City, Prime..... | 68 |
| Lard, City, No. 1..... | 50 |
| Lard, Western, prime..... | 66 |
| Cotton-seed, Crude, prime..... | 30 |
| Cotton-seed, Crude, off grades..... | 28 |
| Cotton-seed, Summer Yellow, prime..... | 39 |
| Cotton-seed, Summer Yellow, off grades..... | 37 |
| Sperm, Crude..... | 75 |
| Sperm, Natural Spring..... | 79 |
| Sperm, Bleached Spring..... | 84 |
| Sperm, Natural Winter..... | 85 |
| Sperm, Bleached Winter..... | 96 |
| Whale, Crude..... | 55 |
| Whale, Natural Winter..... | 56 |
| Whale, Bleached Winter..... | 58 |
| Whale, Extra Bleached..... | 59 |
| Sea Elephant, Bleached Winter..... | 35 |
| Menhaden, Crude, Southern..... | 38 |
| Menhaden, Light Pressed..... | 43 |
| Menhaden, Bleached W'ter..... | 44 |
| Menhaden, Extra Bleached..... | 46 |
| Tallow, City, prime..... | 60 |
| Tallow, Western, prime..... | 54 |
| Cocconut, Ceylon..... | 64 |
| Cocconut, Cochitr..... | 64 |
| Cod, Domestic..... | 38 |
| Cod, Foreign..... | 42 |
| Red Elaine..... | 44 |
| Red Saponified..... | 54 |
| Bank..... | 37 |
| Strata..... | 38 |
| Olive, Italian, bbls..... | 58 |
| Neatsfoot, prime..... | 75 |
| Palm, prime, Lagos..... | 74 |

Mineral Oils—

| Black, 29 gravity, 25 to 30 cold test..... | 7 | 7 1/2 |
|--|-------|-------|
| Black, 29 gravity, 15 cold test..... | 7 1/2 | 8 |
| Black, 29 gravity, summer..... | 6 | 6 1/2 |
| Cylinder light, filtered..... | 14 | 16 |

| Cylinder, dark, filtered..... | 10 | 13 |
|--------------------------------------|-------|--------|
| Paraffine, 23 1/2 to 24 gravity..... | 11 | 12 |
| Paraffine, 25 gravity..... | 10 | 11 |
| Paraffine, 28 gravity..... | 7 1/2 | 8 |
| Paraffine, red..... | 8 1/2 | 10 1/2 |

Paints and Colors—

| Barytes, Foreign, 10 ton..... | \$22.00 | \$24.00 |
|--|---------|---------|
| Barytes, Amer. floated..... | 29.00 | \$32.00 |
| Barytes, Amer. No. 1..... | 16.00 | \$18.00 |
| Barytes, Amer. No. 2..... | 13.00 | \$15.00 |
| Barytes, Amer. No. 3..... | 11.00 | \$12.00 |
| Blue, Celestial..... | 6 | 8 |
| Blue, Chinese..... | 40 | 50 |
| Blue, Prussian..... | 25 | 40 |
| Blue, Ultramarine..... | 25 | 40 |
| Brown, Spanish..... | 3 1/2 | 1 |
| Brown, Vandyke, Amer..... | 3 | 3 1/2 |
| Brown, Vandyke, English..... | 6 | 8 |
| Carmin, No. 40, in bulk..... | 2.75 | |
| Carmin, No. 40, in boxes or barrels..... | 2.85 | |
| Carmin, No. 40, in ounce bottles..... | 3.75 | |
| Chalk, in bulk..... | 1.75 | 2.00 |
| Chalk, in bbls., \$100 m..... | 33 | 40 |
| China Clay, English..... | 13.00 | \$18.00 |
| Cobalt Oxide, prep'd..... | 9.00 | \$11.00 |
| Cobalt Oxide, black..... | 1.90 | |
| Cobalt Oxide, black..... | 1.96 | |
| Green, Paris, in bulk..... | 10 | 10 1/2 |
| Green, Paris, 170 to 175 b..... | 10 1/2 | 11 |
| Green, Paris, small pack..... | 12 | 17 |
| Green, Chrome, ordinary..... | 6 | 12 |
| Green, Chrome, pure..... | 22 | 25 |
| Lead, Eng. B.B. white..... | 8 1/2 | 10 |
| Lead, Ann. White, dry or in oil..... | 7 | 7 1/2 |
| Kegs, lots less than 500 b..... | 6 1/2 | 6 3/4 |
| Kegs, lots 500 b to 5 tons..... | 6 1/2 | 6 3/4 |
| Kegs, lots 5 tons to 12 tons..... | 6 1/2 | 6 3/4 |
| Kegs, lots 12 tons and over..... | 6 1/2 | 6 3/4 |
| Lead, White, in oil, 25 b tin pails, add to keg price..... | | 1/2 |
| Lead, White, in oil, 12 1/2 b tin pails, add to keg price..... | | 1 |
| Lead, White, in oil, 1 to 5 b as sorted, add to keg price..... | | 2 1/2 |
| Lead, Red, bbls. and 1/2 bbls..... | 6 | 7 |
| Lead, Red, kegs..... | 6 1/2 | 7 1/2 |
| Litharge, kegs..... | 6 1/2 | 7 1/2 |
| Litharge, bbls. and 1/2 bbls..... | 6 | 7 |

TERMS, &c.—Lead and Litharge.—On lots of 500 b or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

| Ocher, Rochelle..... | 1.35 | 1 1/2 |
|---------------------------------------|--------|--------|
| Ocher, French Washed..... | 1 1/2 | 2 1/2 |
| Ocher, German Washed..... | 1 1/2 | 2 1/2 |
| Ocher, American..... | 1 1/2 | 2 1/2 |
| Orange Mineral, English..... | 8 1/2 | 9 |
| Orange Mineral, French..... | 10 | 10 1/2 |
| Orange Mineral, German..... | 8 1/2 | 9 |
| Orange Mineral, American..... | 8 1/2 | 9 |
| Paris White, English Cliff..... | 1.00 | \$1.15 |
| Paris White, American..... | 65 | 75 |
| Red, Indian, English..... | 5 1/2 | 7 |
| Red, Indian, American..... | 2 | 6 1/2 |
| Red, Turkey..... | 9 | 14 |
| Red, Tuscan..... | 9 | 11 |
| Red, Venetian, American..... | 1.00 | \$1.10 |
| Red, Venetian, English..... | 1.20 | \$1.35 |
| Sienna, Italian, Burnt and Powd..... | 4 | 5 |
| Sienna, Ital., Burnt Lumps..... | 1 1/2 | 3 1/2 |
| Sienna, Ital., Raw, Powd..... | 4 1/2 | 5 1/2 |
| Sienna, Ital., Raw, Lumps..... | 1 1/2 | 3 1/2 |
| Sienna, American, Raw..... | 1 1/2 | 3 1/2 |
| Sienna, American, Burnt and Powd..... | 1 1/2 | 3 1/2 |
| Talc, French..... | 1 1/2 | 3 1/2 |
| Talc, American..... | 1 1/2 | 3 1/2 |
| Terra Alba, Fr'ch, \$100 b..... | 95 | \$125 |
| Terra Alba, American No. 1..... | 70 | 80 |
| Terra Alba, American No. 2..... | 65 | 75 |
| Umber, Turkey, Burnt and Powd..... | 3 1/2 | 4 |
| Umber, Turkey Bnt. Ln..... | 2 1/2 | 3 |
| Umber, Turkey, Raw and Powd..... | 3 1/2 | 4 |
| Umber, Turkey Bnt. Amer..... | 1 1/2 | 3 1/2 |
| Yellow, Chrome..... | 10 | 25 |
| Vermilion, American Lead..... | 11 1/2 | 12 |
| Vermilion, Quicks'er, bulk..... | 57 | |
| Vermilion, Quicks'er, bags..... | 68 | |
| Vermilion, Quicksilver sm'r..... | 62 | |
| Vermilion, English Import..... | 85 | 90 |
| Vermilion, Imitation, Eng..... | 8 | 35 |
| Vermilion, Trieste..... | 90 | 92 1/2 |
| Vermilion, Chinese..... | 92 1/2 | 95 |
| Whiting Common, \$100 b..... | 37 1/2 | 42 1/2 |
| Whiting Gliders..... | 45 | 55 |

| Zinc, American, dry..... | 4 | 4 1/2 |
|---|--------|--------|
| Zinc, French, Red Seal..... | 7 1/2 | |
| Zinc, French, Green Seal..... | 9 | |
| Zinc, Antwerp, Red Seal..... | 7 1/2 | |
| Zinc, Antwerp, Green Seal..... | 7 1/2 | |
| Zinc, German, L. Z. O..... | 6 1/2 | 7 1/2 |
| Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over..... | 10 1/2 | 11 1/2 |
| lots less than one ton..... | 11 | 11 1/2 |
| Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over..... | 10 | 10 1/2 |
| lots of less than 1 ton..... | 10 1/2 | 10 1/2 |
| Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2 %; 25 bbls., 2 %; 50 bbls., 4 %. No discount allowed on less than bbl. lots. | | |

Colors in Oil—

| Black, Drop, Frankfurt..... | 25 | 30 |
|-------------------------------|----|--------|
| Black, Drop, English..... | 12 | 15 |
| Black, Drop, Domestic..... | 7 | 10 |
| Black, Lampblack, Best..... | 20 | 35 |
| Black, Lampblack, Common..... | 7 | 18 |
| Black, Ivory..... | 8 | 15 |
| Blue, Chinese..... | 35 | 40 |
| Blue, Prussian..... | 20 | 45 |
| Blue, Ultramarine..... | 12 | 18 |
| Brown, Vandyke..... | 7 | 12 |
| Green, Chrome..... | 8 | 13 |
| Green, Paris..... | 10 | 18 1/2 |
| Sienna, Raw..... | 7 | 14 |
| Sienna, Burnt..... | 7 | 14 |
| Umber, Raw..... | 7 | 10 |
| Umber, Burnt..... | 7 | 10 |

Putty—

| | | |
|------------------------------|------|------|
| In barrels and 1/2 bbls..... | .013 | .014 |
| In tubs..... | .013 | .014 |
| In tin cans..... | .013 | .021 |
| In bladders.. | .013 | .021 |

Spirits Turpentine—

| In regular bbls..... | .29 1/2 |
|----------------------|---------|
| In machine bbls..... | .30 |

Glue—

| Low Grade..... | 8 | 10 |
|-------------------|----|----|
| Cabinet..... | 12 | 14 |
| Medium White..... | 13 | 15 |
| Extra White..... | 17 | 20 |
| French..... | 10 | 28 |
| English..... | 10 | 18 |
| Irish..... | 12 | |

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

RATES OF SUBSCRIPTION: INCLUDING POSTAGE.

UNITED STATES AND BRITISH AMERICA.

Weekly Edition, Issued every THURSDAY morning..... \$4.50 a year.

Semi-Monthly Edition, First and Third THURSDAYS of every month..... 2.30 "

Monthly Edition First THURSDAY of every month..... 1.15 "

RATES OF ADVERTISING: ONE SQUARE (12 LINES, ONE INCH).

| ONE INSERTION..... | \$2.00 |
|--------------------|--------|
| ONE MONTH..... | 7.50 |
| THREE MONTHS..... | 17.50 |

| New York (Main Office), | 96-102 Reade Street, |
|-------------------------|------------------------------------|
| Philadelphia, | 220 South Fourth Street, |
| Pittsburgh, | Room 509, Hamilton Building. |
| Chicago, | 59 Dearborn Street, cor. Randolph, |
| Cincinnati, | Rooms 22-24 Pickering Building, |
| St. Louis, | Bank of Commerce Building, |
| Boston, | 146 Franklin Street, |
| Cleveland, | 312 The Cuyahoga, |

ALL OTHER COUNTRIES, Per Annum, Postpaid.

Weekly Edition: \$5.00 = £1 = 25 francs = 20 marks = 11 florins = 6 roubles (coin) = 25 lire = 20 pesetas.
Semi-Monthly Edition: \$2.50 = 10/ = 12 1/2 francs = 10 marks = 6 florins = 3 roubles (coin) = 12 1/2 lire = 10 pesetas.
Monthly Edition: \$1.25 = 5/ = 6 1/4 francs = 5 marks = 3 florins = 1 1/2 roubles (coin) = 6 1/4 lire = 5 pesetas.

| SIX MONTHS..... | \$30.00 |
|-----------------|---------|
| ONE YEAR..... | 50.00 |

Rates for larger spaces quoted on application.
DAVID WILLIAMS, Publisher,
THOMAS HOBSON, Manager,
ROBERT A. WALKER, Manager,
J. K. HANES, Business Manager,
GEO. W. COPE, Resident Asso. Ed.
HENRY SMITH, Manager,
H. H. ROBERTS, Manager,
WALTER C. ENGLISH, Manager,
EZRA S. ADAMS, Manager.

BRITISH AGENCY: Office of The Ironmonger, 42 Cannon St., London.

AUSTRALIAN OFFICES: Melbourne, 231 Elizabeth St.; Sydney, 234 Clarence St.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS, on any banking house in the United States or Europe, or by P. O. Money Order on New York. When these cannot be obtained, postage stamps of any country will be received.
Newsdealers or Booksellers in any part of the world may obtain The Iron Age through The American News Company, New York, U. S. A. The International News Company, New York, U. S. A. and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A.

Entered at the Post Office, New York, as Second-Class Matter.

SEPTEMBER 27, 1893.

Hosted by Google

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

GoogleTM books

<https://books.google.com>

